NetworkWorld

September 29, 1997 Volume 14, Number 39 ■ An IDG Publication

N+ news and more starts on page 8.

QUALITY OF SERVICE ■ GIGABIT ETHERNET VS. ATM ■ THE INTERNET AS A BACKBONE ■ LOCAL LOOP COMPETITION ■ THIN CLIENTS ■ ELECTRONIC COMMERCE ■ INTRANETS ■ WINDOWS NT ■ KNOWLEDGE MANAGEMENT ■ ACTIVEX AND JAVA ■

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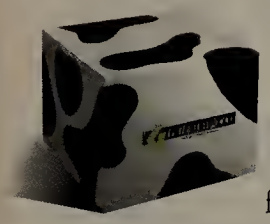

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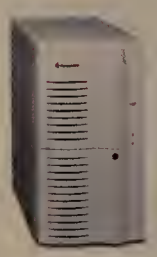

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NetworkWorldContents

September 29, 1997 Volume 14, Number 39

News

8 **Accelar routing switches** do nothing to solve Bay's Layer 3 riddle.

10 **Visa, CompuServe to** offer credit card authorization service based on SET.

12 **Netscape's Marc Andreessen says** the company is still optimistic about thin clients.

17 **NCR software knows** what you do on the Web.

21 **Start-up OneBox** to make its debut at Interop with all-in-one network device.

22 **Taipei's Umax Data Systems** joins network computer club.

23 **Windows developers aren't** sold on Java.

Local Networks

25 **Investment firm looking** for fat profits from thin clients.

28 **Intel gobbles up** network products maker Dayna Communications.

Internetworks

29 **Four new treatments** for management headaches.

31 **High-speed Token-Ring adapter** announced by IBM.

Carriers & ISPs

33 **US WEST is making** a more modest DSL proposal.

36 **Vendors promise** interoperable and higher quality IP telephony products.

Intranet Applications

39 **The latest version** of Microsoft's Web browser passes muster.

39 **Qualcomm moves** well beyond Eudora Pro with new edition of its server software.

Opinions

120 **Mark Gibbs:** A sweat and puffery test.

120 **'Net Buzz:** Warning: That Internet virus warning you received may be a hoax; the hottest 'Net hot spots.

Net Know-It-All. Page 12.

Editorial and advertiser indexes. Page 119.

FIND IT ON FUSION

To quickly get to any online info referenced in *Network World*, enter its DocFinder number in the input box on the home page.

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This Week

Only on Fusion

Keeping Current. Something is in the air, and it's not just teen spirit. Fred McClimans counts down the Top 10 ways you can tell it's the week before NetWorld+ Interop 97. **DocFinder: 4020**

Wireless. A divided Federal Communications Commission last week issued a four-part plan for dealing with companies that successfully bid – but then could not get financing – for new personal communications services licenses. **DocFinder: 4022**

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Bay Networks confronts its Layer 3 conundrum

By Jim Duffy
Billerica, Mass.

It may take more than a new name to make sense of Bay Networks, Inc.'s Layer 3 switching strategy.

This week, Bay will change the name of its Switch Node and Rapid City Communications Layer 3 switches to Accelar Routing Switches, a new umbrella brand for existing and future Layer 3 switches. Switch Node will be known as Accelar 100; the Rapid City line will make up the Accelar 1000 series.

But Bay must grapple with positioning Switch Node, which, at $4,000 per 100M bit/sec port and a forwarding rate of 1 million packet/sec, costs and performs much like a high-end router. This flies in the face of Bay's own rationale for routing switches, which are supposed to cost a fraction of the price of routers and perform up to seven times faster.

SHAWN HENRY

Bay is banking big on routing switches, says VP of Architecture Bill Hawe.

Bay also must balance current Accelar offerings with those in development that will implement the company's 1 million packet/sec Route Switch Processor (RSP).

See **Accelar,** *page 12*

Cisco to take users on a tour of 'Milan'

By Jim Duffy
Atlanta

Cisco Systems, Inc.'s strategy for migrating campus nets to gigabit speeds involves a lot more than just Gigabit Ethernet.

It hinges on "Milan," a line of high-end, multigigabit Layer 3 switches in development that are expected to scale to 100G bit/sec over the next two years. It also is rooted in NetFlow LAN Switching, an iteration of Cisco's packet caching technology for LAN switches.

And it includes new Gigabit Ethernet supervisor and switching modules for the Catalyst 5000 LAN switch line.

Cisco is expected to disclose its gigabit network road map and demonstrate Gigabit Ethernet modules at next week's NetWorld+Interop 97 show here. The road map comes at a time when observers are anxious for Cisco to begin delivering the goods from its $220 million acquisition of Gigabit Ethernet pioneer Granite Systems, Inc. (*NW,* Sept. 9, 1996, page 8).

Cisco, traditionally a vendor that eschews standards, claims it is the waiting for Gigabit Ethernet standards to

See **Milan,** *page 20*

NETWORLD+INTEROP 97

INSIDE INTEROP

- **Nortel to make noise in voice-over-frame relay market.** Page 10.
- **Start-up OneBox tries to do it all with new LAN switches.** Page 21.
- **PSINet preps Web site hosting service that accommodates currency differences.** Page 16.
- **Prominet and FORE soup up switches with Layer 3 routing.** Page 25.
- **Log on for a show planning guide and for the Gigabit Ethernet Face-off forum.**

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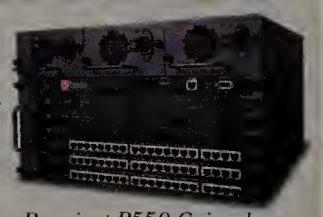

Prominet P550 Cajun box

Sun to wage battle over messaging turf

By Paul McNamara
Mountain View, Calif.

Sun Microsystems, Inc. next week will launch a bold offensive on the fast-growing and increasingly crowded market for Internet standards-based e-mail products.

The company's JavaSoft division plans to unveil Solstice Internet Mail Server (SIMS) Global Business Edition, a radically re-engineered version of the Internet Message Access Protocol 4 (IMAP4)-enabled server the company began peddling last year.

The new edition reportedly will be able to handle far more messages and users than the previous version, while gaining improved management capabilities and support for Secure Multi-purpose Internet Mail Extensions (S/MIME).

Sun is touting the release as its enterprise-worthy answer to products from Internet e-mail leaders such as Netscape Communications Corp. and Software.com, Inc., as well as the once-proprietary, now-standards-laden e-mail packages from Microsoft Corp., Lotus Develop-

See **Sun,** *page 18*

The Java chips are coming

But start-up Patriot Scientific may beat Sun to market.

By John Cox and Marc Songini
Sunnyvale, Calif.

A lucky and fast-moving start-up may beat Sun Microsystems, Inc. to the punch with a full-blown microprocessor specifically designed to run Sun's own Java language.

According to industry sources, the Sun Microelectronics (SME) division next month at the Microprocessor Forum is expected to lay out a schedule for its first so-called Java chip, a microprocessor designed specifically to run the Java language.

But Patriot Scientific Corp., a San Diego chip maker, is wrapping up its port of Sun's JavaOS to Patriot's own Java processor, the PSC1000.The JavaOS includes compatibility software, the Java Virtual Machine (JVM) for compatibility and basic operating system features such as booting, thread management and handling interrupts.

"We expect the JavaOS port to be completed very shortly and the chip will be available in large quantities this year," said Phil Morettini, Patriot's vice president of sales and marketing. Before the end of this year, Patriot will demonstrate a network computer reference design to show off what its chip can do in a computer system.

MORE ON JAVA AND THIN CLIENTS

Microsoft developers aren't buying into Java. Page 23.

Netscape's Marc Andreessen remains bullish on thin clients. Page 12.

What does it all mean?

If the Java chips can deliver enough speed, and do it cheaply, they could fuel the spread of Java into a new class of applications and devices.

These could include everything from personal digital assistants (PDA), copy machines and fax machines to cell phones and Java network computers, all of which would have in common a connection to the Internet.

There is nothing magical about the Java chip and JavaOS combination: The chip provides applets and applications with a performance boost, while the JavaOS handles the low-level functions needed to actually run an application. In fact, Patriot is evaluating several real-time operating systems as alternatives to the JavaOS.

Sun officials declined to confirm their schedule, which apparently calls for the

See **Java Chip,** *page 19*

Avesta spices up net management

By Chris Nerney
New York

It might seem as if there are more than enough network and system management products on the market, but Kam Saifi and his ex-Wall Street colleagues think there is room for at least one more.

Start-up Avesta Technologies, Inc., the company Saifi helped form in 1996 after leaving Morgan Stanley's IT department, this week will launch an ambitious software package for managing enterprise networks comprising thousands or potentially millions of managed objects. The software will be shown at NetWorld+Interop 97 in Atlanta next week.

Avesta's core offering is called Trinity. It relies on a combination of Java and patent-pending reasoning technology to

See **Avesta,** *page 21*

FastComm SNA Bulletin #1

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News briefs, September 29, 1997

SAFE and sound?

The House of Representatives Commerce Committee last week rejected the proposed Oxley-Manton amendment to H.R. 695, the Security and Freedom Through Encryption Act (SAFE). The amendment would have gutted the act, which is designed to liberalize export of products that use encryption. It would have substituted language requiring all U.S. products that use encryption to have a key escrow system that law enforcement officials could use to decrypt scrambled data.

The Oxley-Manton amendment was denounced by a broad swath of the software and telecommunications industry, civil liberties groups and law professors throughout the U.S. They claimed the amendment would undermine constitutional freedoms, require a huge investment to change software now on the market and lessen network security.

Though SAFE passed intact, the Commerce Committee added to it a different amendment introduced by Rep. Edward Markey (D-Mass.) and Rep. Rick White (R-Wash.). This amendment would create a National Technologies Center to assist law enforcement officials in handling encrypted documents encountered during an investigation. The Marley-White amendment also directs the National Telecommunications Information Administration to conduct a study on the implications of mandatory key-escrow use.

FCC bailing out wireless vendors

Members of the Federal Communications Commission last week compromised on how to deal with companies that cannot pay for wireless spectrum licenses they won in an auction last year. The licenses are for use in building personal communications services. The FCC is offering financially troubled companies that cannot raise financing to pay for licenses four options, including forfeiture of all licenses. Companies have until Jan. 15, 1998, to decide which option they want.

It initially looked as though the government would raise more than $10 billion from the auction, but now it appears the government will be lucky to take in even half that.

Inside Intel

Intel Corp. confirmed last week that the Federal Trade Commission (FTC) has embarked on an investigation of the company's business practices. The FTC last month approached Intel seeking more information about the chip giant's pending $420 million acquisition of rival vendor Chips & Technologies, Inc. Intel officials promised full cooperation with the investigation. They added that the company already has "an aggressive program in place" to ensure that its business practices fully comply with federal law. A similar 1993 FTC investigation concluded that no further action needed to be taken against Intel.

Calling all multinationals

Cable & Wireless PLC last week announced its Global Intelligent Virtual Network (GIVN), a managed global private network service targeted at multinational corporations with high volumes of international voice and switched data traffic.

GIVN includes centrally managed switched voice and data services, consistent numbering plans, worldwide global billing, and switched data applications such as videoconferencing.

Fax flexibility

Castelle, Inc. next week will introduce upgrades to its fax servers that let users fax over wide-area IP networks, as well as dial through the public switched telephone network.

Castelle also will announce a partnership with NetXchange Communication, Ltd. that will let Castelle customers fax over the Internet to NetXchange locations, where the service provider's servers will dial locally to deliver the fax. Castelle FaxPress gear supports Novell, Inc. and Microsoft Corp. LANs.

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Visa and CompuServe get SET for 'Net sales

By Ellen Messmer
San Francisco

Visa International, Inc. and CompuServe Network Services, Inc. early next year each will begin offering banks and World Wide Web merchants a service for credit card purchase authorization based on the new SET protocol.

Finalized just last May, the Secure Electronic Transaction (SET) standard relies on X.509 public-key digital certificates to link the buyer's identity to his credit card number.

SET ensures that card numbers sent over the Internet and into traditional credit authorization networks will be encrypted end-to-end between the buyer, seller and bank.

Banks that issue Visa credit cards to merchant customers will be able to subscribe to the SET credit card service, which will be based on SET gateway equipment from IBM. The banks in turn are expected to market the SET transaction service to Web merchants that take Visa cards.

Pricing has not been fixed for the SET service, expected to start January 1, according to Ann Culver, CompuServe Network Services product manager. CompuServe provides network transport services for Visa.

MasterCard International, Inc. has already announced SET services for its members. But much remains to be done before Web merchants can make practical use of SET. And SET still faces an uphill battle to displace Secure Sockets Layer (SSL), the encryption method typically used today for sending credit card data over the Internet.

The problem with SSL is the card number is left exposed on the merchant server, which means the number can be hacked from Web servers or lifted by the merchant's employees. The SET standard has been devised to limit that risk as much as possible.

However, Visa and MasterCard will not be handing out digital certificates to banks or card holders, or testing SET electronic wallets or merchant servers, until October. SET-accredited software and merchant Web sites will sport the SET logo.

IBM's Scott Dueweke *says, "Visa and MasterCard have to lower their rates for SET."*

In addition, Visa and MasterCard will have to provide strong financial incentives to get Web merchants to upgrade from SSL to SET, said Scott Dueweke, marketing manager at IBM, which is offering a full range of SET products from electronic wallets to merchant servers to processing gateways.

Visa has said it will waive transaction fees for SET for two years, starting next April. This would save Web merchants 18 cents per $100 transaction. But that enticement is not good enough, Dueweke said.

Today, Web merchants are charged upwards of a 2.5% fee for each sale they make over the World Wide Web, the same as the mail-order telephone rate.

This fee is higher than the more typical 1.2% charged to retail stores or restaurants that can get a card-holder signature during a purchase. Visa and MasterCard have not disclosed how low the SET rate will be.

"They still need to lower the rate on the Web for SET to reflect the reduced fraud risk it provides," Dueweke said. Merchants and banks will be putting pressure on the two card associations to do this, he added.

According to some analysts, SET 1.0 is unproven and is overly complex because it requires about 28 network transmissions for one SET transaction. They advise banks and Web merchants to wait for SET 2.0, which could take 18 months to appear.

Victor Wheatman, an analyst at Gartner Group, Inc., advised, "Unless you have a compelling reason to use SET 1.0, don't bother. Hold back and wait until it's more stable or it reaches critical mass." ■

Nortel crafts voice-over-frame relay switch

By Tim Greene
Atlanta

Northern Telecom, Inc. next week will burst on the voice-over-frame relay scene at NetWorld+Interop 97 with two frame relay access devices (FRAD) that enable users to pull interoffice phone calls off expensive public phone links.

Nortel will show prototypes of two new access boxes, the Passport 4430 and Passport 4450, three- and five-slot chassis with voice cards that can compress a 64K bit/sec voice channel to 8K bit/sec. The boxes support frame relay access links ranging in speed from 56K bit/sec to T-1.

While other vendors, including ACT Networks, Inc. and Nuera Communications, Inc., also offer voice FRADs, the Nortel offerings are tightly integrated with Nortel Meridian Passport ATM switches that sit in the carrier network, according to Jennifer Pigg, vice president of data networking for The Yankee Group, a consultancy in Boston.

The combination can pay dividends for customers, she said. For example, the 4430 and 4450 fragment large data packets to minimize the delay that might otherwise slow down time-sensitive voice packets. Without integration between the FRAD and the switch, those small, fragmented data frames would be delivered to routers in the customer's network, increasing the number of packets the router has to process and promoting congestion.

If the Nortel FRAD is used in conjunction with a Passport ATM switch in the network, the switch reassembles the fragmented packets so the packets delivered to the router are larger, and the traffic flow eats up less processing power.

The 4430 and 4450 chassis come with a base board that includes a 10M bit/sec Ethernet port and three serial interfaces that can be used locally or to support WAN interfaces.

Users have the option of adding other interfaces, including a two-port analog card and a T-1 card. Later, the company will add token-ring and legacy LAN interfaces as well as ISDN and modem backup for failed frame relay

See **Nortel,** *page 20*

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Andreessen lays out thin-client future

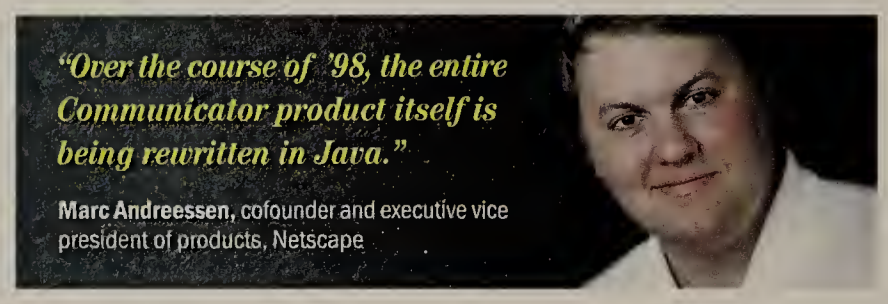
By Paul McNamara
Mountain View, Calif.

Network computers (NC) may be drawing yawns from corporate customers surveyed about their buying intentions, but Netscape Communications Corp. remains bullish on the future of NCs and the broader sphere of thin-client computing.

In a telephone interview last week, Netscape cofounder Marc Andreessen insisted the NC movement is alive and well, with appearances to the contrary simply a matter of today's sparse product choices. He also emphasized that his company's thin-client strategy — predicated on the heavy use of Java, JavaBeans, HTML and Dynamic HTML — transcends any particular type of hardware.

"There are a couple of hundred new kinds of devices with different form factors: some desktop-based, some hand-held, some TV-based or cable set-top based," Andreessen said. "We want to be able to have complete coverage across all of those."

Toward that end, Netscape has promised to deliver a 100% Pure Java version of its Navigator Web browser in the first quarter of 1998, with the rest of the Communicator client suite getting the same treatment shortly thereafter. The Java browser will be bundled with NCs from Sun Microsystems, Inc. and Oracle Corp.



On the server side, members of Netscape's SuiteSpot family — including Calendar, Collabra, Directory, Messaging and Enterprise servers — have already got, or will be getting, a complete set of HTML and Java interfaces, Andreessen said. This means that any device that understands HTML or Java "will be able to contact one of these servers over the network and get an interface for the user without having to have that preinstalled on the client machine," he added.

Netscape's Messenger Express and Calendar Express already provide this HTML interface into their respective servers, Andreessen said. Other services, such as document management and searching, are scheduled for inclusion in the next major revision of SuiteSpot, code-named Apollo, due in the first half of next year.

"[Messenger Express] means you can walk up to any device on the network, type in your name and the address of your mail server, and you can read all your e-mail," Andreessen said. "It doesn't matter where you are on the network or what kind of device you are using."

A key to the thin-client evolution will be the expanded use of Dynamic HTML, the de facto standard for infusing Web pages with application-like capabilities. Netscape and chief rival Microsoft Corp. continue to do battle over defining and deploying the Dynamic HTML standard.

"The ability to do Dynamic HTML is something we think is very important," Andreessen said. "It's going to be a primary way that we can provide these interfaces off of SuiteSpot, and also we think application developers can [use it to] quickly build these kinds of apps."

Despite all the enthusiasm and hype pouring out of Netscape, Oracle, Sun, IBM and others, the thin-client concept continues to be a tough sell in some enterprise shops that have come to rely on the full-throated power of PCs.

"We've looked, but there's no real benefit [in thin clients] to us today," said Phil Gibson, director of InterActive Marketing at National Semiconductor Corp. in Santa Clara, Calif. "Somebody with no infrastructure who had to tap a Web site, maybe it would make sense." ■

Accelar

Continued from page 8

RSP hardware upgrades may already be in the offing for the Accelar lie.

Announced last February, the Accelar 100 — or Switch Node — is a five-slot, 1.2G bit/sec switch that currently houses up to 64 10M bit/sec ports and eight 100M bit/sec ports (*NW*, Feb. 17, page 4). It is designed to be a "network center" switch for networks of 500 to 1,000 stations, Bay said.

Next month, Bay will unveil 16-port 10M/100M bit/sec autosensing modules for the switch that enable it to sport up to 64 10M/100M ports. That module will cost about $12,000, Bay said, which means Accelar 100 — with chassis, CPU and four 10M/100M modules — will cost $875 per 10M bit/sec port and more than $4,600 per 100M bit/sec port.

Asked to explain why Switch Node is priced like a router per 100M bit/sec port, product marketing manager Mark MacDonald said Accelar 100 was never intended to be stuffed with 100M bit/sec ports. Indeed, Bay has scrapped its initial plans to add a Gigabit Ethernet module to Accelar 100, according to Bill Hawe, Bay's vice president of architecture.

"We're positioning Switch Node as a 10M bit/sec switch," MacDonald said. "We're positioning it as a proof point of our technology."

A 10M bit/sec Layer 3 "network center" switch? At $875 per 10M bit/sec port? "They're dancing," said Craig Johnson, an analyst at Current Analysis, Inc., of Ashburn, Va. "Really what it comes down to is the Switch Node is dead."

"Bay needs to rationalize its pricing a little bit," said David Passmore, president of consultancy Decisys, Inc., of Herndon, Va., in the understatement of the year.

Indeed the company does. At $650 to $700 per 100M bit/sec port and 7 million packet/sec, the Accelar 1000 is, to put it mildly, a better deal. The Accelar 1000, which comes in stackable, four- and eight-slot chassis form factors, is targeted at backbones with more than 1,000 stations, Bay said.

Yet, a price cut for Accelar 100 is not in the offing, Hawe said. Perhaps one will come when Bay expands the Accelar line with new switches based on the RSP, which was unveiled last spring at NetWorld+ Interop 97. Or perhaps Bay will have to do more juggling.

"Even the performance on [the RSP] did not seem as high as Rapid City ASIC solutions," said Current's Johnson. "It will be real interesting to see the game that they actually play here."

We are family

Bay argues that Accelar is family, one that will be tied together by software.

"There's a series of software or firmware [releases] that improve the fidelity and the function of these devices that is easy to cross-pollinate across this product line," Hawe said. "There's a lot of sharing of technology that you'll see in that dimension even though underneath one might be using a different internal switching structure — RSP, or the technology we got from Rapid City, or the Switch Node."

Hawe did not disclose a time frame for the initial release of this software, nor did he say when RSP-based Accelar switches will emerge. ■

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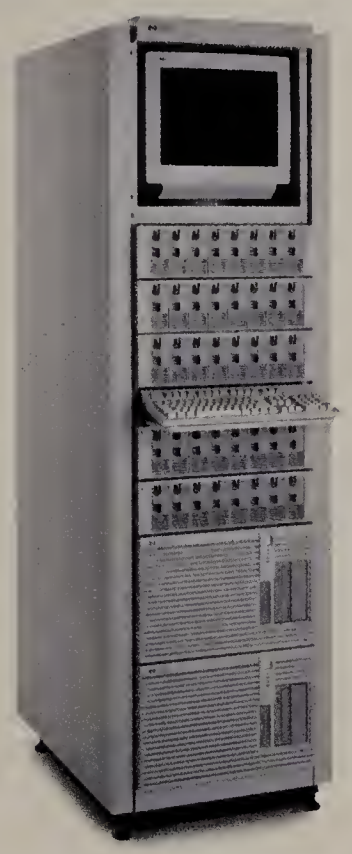

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Currency translation eases international Web commerce

PSINet service will support transactions in 126 currencies.

By Denise Pappalardo

If you're hoping to use your Web site to rack up sales from around the world, you should consider making your site franc-, lira- and krona-compliant.

No, these are not new protocols, but international currencies.

PSINet, Inc. is expected to announce an electronic commerce service at NetWorld+Interop 97 in Atlanta next week that will let its Web hosting customers transact business in more than 126 currencies.

PSINet's PSIWeb, Inc. subsidiary will be offering customers a multicurrency payment system developed by WorldPay, Ltd., a Supernet Group, Ltd. company. The payment system will be integrated into a new electronic commerce package.

The package will include Mercantec, Inc.'s SoftCart electronic shopping cart application, as well as WorldPay's service and server software that supports Secure Sockets Layer (SSL) 128-bit key encryption tunneling, said John Watson, director of emerging products for PSIWeb.

The WorldPay software includes a component that runs on the merchant's Web site.

If customers request information about pricing by clicking an icon, they are presented with a list of currencies. Clicking on the price request icon opens an SSL-encrypted tunnel to WorldPay's database, which returns the price in figures familiar to the user.

If users decide to make a purchase, their credit card information is sent through the same tunnel to National Westminster Bank PLC for authorization. All WorldPay transactions will be contained within PSINet's Internet backbone, never crossing over to other Internet service provider facilities, Watson added.

Why would a business want to subscribe to this service? Because if a user in Portugal is shopping the 'Net for a set of Winnie-the-Pooh bookends, the Web merchant is more likely to land the sale if the cost is presented in Portuguese escudos rather than U.S. dollars, said Dan Taylor, industry analyst at The Aberdeen Group, Inc., a Boston-based consulting firm.

"PSINet is taking a sophisticated approach to handling financial transactions," Taylor said.

Internet commerce is booming

International Data Corp. expects worldwide Internet commerce spending by business users to jump drastically by the year 2000.

(In millions)

Market segment	1996	2000
Small business	$252	$23,379
Midsize/ large business	$747	$53,765
Government	$52	$4,074
Education	$197	$9,782

1996 numbers based on total spending of $1.2 billion.

2000 numbers based on a projected total spending of $91 billion.

People from outside the U.S. are visiting domestic Web sites, but they are not buying, Watson said. PSINet believes this is because they cannot easily understand how much the merchandise costs, he said.

JumboSports, Inc. plans to add an online catalog to its Web site next year, but was avoiding an international version because of currency differences, said Tom McCormick, senior manager of store systems/PC support at JumboSports, a Tampa, Fla.-based sports equipment retail chain.

WorldPay's service sounds as if it will take away the headaches involved in selling products in multiple countries, he said. "This would open up a section of the world we had not considered because of the hassles that would be involved," McCormick said.

That is exactly why PSINet is teaming with WorldPay.

WorldPay's system runs on a Sybase, Inc. SQL Server 11 database that connects directly to National Westminster Bank in the U.K. The database stores the value of all currencies and is updated every 24 hours.

Availability and pricing will be announced next week.

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THE WORLD'S SHORTEST SHORT STORIES. *Two of a series.*

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ISP software tracks customers' every move

Controversial software potentially makes it easy for Internet service providers to spy on subscribers.

By Ellen Messmer
Dayton, Ohio

NCR Corp. claims it has software that will let Internet service providers track everything a subscriber does or buys on the Internet. The question is: Will anyone use it?

The controversial software, disclosed to *Network World* last week, is designed not for spying but for warehousing and analyzing buying patterns. This allows vendors to target specific customer interests, the company said.

WebData Warehouse will allow ISPs "to track what customers see and what they're ordering," said Scott Swain, NCR's director of Internet electronic commerce product marketing in the computer systems group.

"The idea is that they would know more about you so they could do more promotions to you," Swain said. The software will be formally unveiled next week and is due by year-end.

ISPs might not take the bait. "We would never do this," proclaimed Sherman Woo, director of global commerce at US WEST Communications, Inc., which now offers Internet service. "We personally should be very guarded about privacy on the Internet before we screw this up."

However, for security reasons, US WEST does monitor activity on its Web site, which is used to sell telecommunications services to competing telecommunications providers. Woo said the US WEST Web sales site was established to comply with the Telecommunications Act of 1996 requirement that the regional Bell operating companies impartially sell network services to competitors.

UUNET's CEO John Sidgmore: *"We wouldn't monitor UUNET customers, but I could see monitoring other subscribers at other ISPs."*

No use at UUNET?

UUNET Technologies' CEO John Sidgmore rejected the idea of monitoring the company's subscribers. Interestingly, Sidgmore said UUNET would consider monitoring subscribers on another ISP as a service to that ISP, if that were possible.

Consumer privacy advocates said there did not, at least so far, seem to be any technical way for ISPs to track and analyze subscriber movements.

"There's no easy way to do this now," said Dave Banisar, staff attorney at Washington, D.C.-based advocacy group Electronic Privacy Information Center.

Banisar noted there is little under U.S. law that protects consumer privacy. He added that a bill now pending in Congress, the Consumer Internet Privacy Protection Act of 1997, would prohibit ISPs from monitoring subscribers without their permission.

Though unwilling to disclose names, Swain insisted the ISPs want the monitoring software to be able to collect marketing data on their subscribers so they can push advertising.

"Some of the ISPs are asking for this," Swain said. "At $19.95, an ISP is not making money now."

Mining the store

NCR is not just after ISPs, but is targeting its Teradata data warehouse customers with software that can capture and analyze sales data from electronic catalogs. The new NCR product line includes WebTrack, software that will let companies doing business on the 'Net capture sales data. WebTrack is similar to the NCR software today used in retail store point-of-sales devices or bar-coding equipment that transmits purchase data to the NCR Teradata warehouse. New WebMining software then would let retailers analyze the transmitted data.

NCR customers, such as JC Penney Company, Inc., could apply this to business-to-business or consumer ordering over the 'Net, merging the sales transaction off the Web page with their storewide sales data, said NCR's Swain. ■

CORRECTIONS

Our review of Xcert Software, Inc.'s Sentry CA certificate server in the Sept. 1 issue should have said that the product can create certificates without the aid of third-party licenses.

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UUNET targets content providers with new dial-up multicast service

Company plans to extend offering to dedicated business service customers.

By Denise Pappalardo

UUNET Technologies, a division of WorldCom, last week rolled out a multicast service that will let Internet dial-up users access audio and video events.

The company's UUCast service will enable content providers like CNN Inter@ctive and AudioNet, Inc. to broadcast news events or concerts to users on UUNET's dial-up network. This service is expected to spare content providers the expense of investing in equipment and adding bandwidth that otherwise would be necessary to support video or audio broadcasts.

UUCast lets companies disseminate up to 250,000 simultaneous streams of content to customers of any Internet service provider or online service provider using UUNET's dial-up network. UUNET hosts Microsoft Network, Earthlink and GTE Internet Solutions dial-up users. Additionally, the company soon will gain America Online and CompuServe users as a result of WorldCom's recent acquisition involving those service providers.

UUCast initially will not benefit customers that access the Internet via UUNET's dedicated business services — and these are the customers that make up the majority of the Fairfax, Va.-based ISP's business, said Joe Bartlett, program manager at The Yankee Group, a market research firm in Boston. But UUNET is planning to extend UUCast to these customers early next year, he said.

The service is available to content providers in stream sizes ranging from 5K bit/sec to 128K bit/sec. Lower speeds are best suited for ticker services like stock quotes, while higher speeds are best for audio and video broadcasts.

"Multicasting will let us reach hundreds of thousands of users at the same time," said Todd Wagner, CEO of AudioNet, a Dallas-based audio content provider specializing in sports, radio station and music Internet broadcasts.

AudioNet is using UUCast and broadcasting services from other ISPs to create a multicast backbone, Wagner said. It is necessary to use multiple providers to support the amount of content sent over the 'Net by AudioNet. The company broadcasts and hosts over 250 radio stations, 1,700 full-length CDs and games for more than 140 sports teams.

Because UUNET's service is not based on a specific vendor's multicasting products, as are some of its competitors' offerings, customers can use any company's software to create content, said Ralph Montfort, manager of network products at UUNET.

Multicasting for the masses

Internet service providers are offering a variety of multicasting services that let customers sign up on a per-event basis to broadcast content, such as a rock concert, or to deliver more permanent content like daily stock information.

Provider	Service	Options	Target customers
MCI	RealNetwork	Per event, daily and 24x7	Business users and content providers
UUNET	UUCast	Monthly for dedicated bandwidth	Content providers and business users (next year)
Digex	Live Event Stadium	Per event	Business users and content providers

UUCast architecture

UUNET has deployed more than 50 Cisco Systems, Inc. 4700 routers throughout its network to provide multicasting services.

The routers support the Internet Engineering Task Force's multicast protocol specifications such as IP Multicast, Internet Group Management Protocol and Protocol Independent Multicast.

Digex Communications, Inc. and MCI Communications, Inc. previously announced multicast services based on Progressive Networks technology.

UUCast is available now for $2,200 per month for a 5K bit/sec stream and $10,000 per month for a 25K bit/sec stream.

✆ UUNET: (703) 206-5600

Cabletron seals deal for net management with US WEST

By Jim Duffy

Denver

Cabletron Systems, Inc. this week will make a major stride in its effort to shed the "device management" label from its Spectrum platform.

US WEST !nterprise Networking will announce it has selected Spectrum over 12 other systems as the basis for its Managed Data Services (MDS) outsourcing service. Under MDS, !nterprise engineers manage end-user data networks.

Spectrum was selected over Hewlett-Packard Co.'s OpenView, Sun Microsystems, Inc.'s SunNet Manager, IBM's NetView for AIX and Bull Information Systems, Inc.'s ISM/OpenMaster, among others, said John Sims, MDS director. Spectrum servers will be deployed in cities within US WEST's operating region based on customer acceptance of the MDS offering.

Currently, there are two Spectrum servers in the MDS network operations center in Minneapolis. Cabletron said the agreement could net it millions of dollars over several years.

Cabletron has targeted telecommunications and carrier networks as key growth markets for its Spectrum offering. Though considered by many observers to be technically superior to rival offerings from HP, IBM and Sun, Cabletron's legacy as a hub and switch manufacturer has been an albatross for Spectrum. Many viewed the product solely as a manager of network devices.

But this deal, coupled with recent wins with BBN and Deutsche Telekom, has raised Spectrum's profile, analysts said.

"Spectrum has tremendous multivendor capability now," said John McConnell, president of McConnell Consulting, Inc., in Boulder, Colo. "[Cabletron has] 400 different products that Spectrum can handle."

That might be good news for !nterprise, which previously based its MDS service on myriad, disparate element managers such as Cisco Systems, Inc.'s CiscoWorks, 3Com Corp.'s Transcend, Bay Networks, Inc.'s Optivity and Concord Communications Corp.'s Network Health reporting tool, and network optimization tools from Optimal Networks, Inc.

"We needed to select a primary platform to be our base polling engine and build everything up on top of that," Sims said.

Cabletron is working with !nterprise to customize Spectrum for the MDS mission. For instance, the companies are tweaking Spectrum to establish thresholds for buffer overflows and CPU utilization for Cisco routers in a frame relay network, as well as issue traps for when limits are exceeded, Sims said. ■

Sun

Continued from page 8

ment Corp. and Novell, Inc.

Sun last week declined to divulge details of the announcement, which is expected at NetWorld+Interop 97 in Atlanta.

Industry experts see the company's initiative as both a daunting challenge and a great opportunity.

"They're facing a pretty tough crowd," said Heather Ashton, an analyst with Hurwitz Group, Inc., of Newton, Mass. "Netscape, Microsoft and Lotus have built a lot of mindshare in the area, not only in providing servers, but also clients."

Another industry analyst, who has talked to Sun about the upcoming release, believes the company has produced a competitive product.

With Sun's sizable customer base, established sales channels and marquee name, the analyst said the company may have the muscle necessary to elbow in among the e-mail giants.

"They've done a lot of work," said the analyst, who requested anonymity. "They've apparently decided that [Simple Mail Transfer Protocol] and the open standards are going to be the base for e-mail in the future. But they also decided that the SMTP base [in SIMS] really wasn't ready for prime time and needed some help."

According to the analyst, Sun is claiming that "help" will make the SIMS Global Business Edition much more scalable than the existing Internet e-mail server, which can handle 1,800 simultaneous users.

SUN'S STARTING POINT

Number of new Internet e-mail users (in millions) for 1996:

1. Netscape: 5.5
2. Qualcomm: 2.9
3. Software.com: 1.2
4. Ipswitch: .21
5. NetManage: .205
6. Control Data: .2
7. Esys: .14
8. TeamWARE: .13
9. Claris: .068
10. Sun: .06

SOURCE: IDC, FRAMINGHAM, MASS.

But the company has yet to quantify the number of end users handled by the new server, the analyst said.

One current user of SIMS, which runs on Solaris and can be accessed from any IMAP4- or POP3-enabled client, believes the server's ability to handle more end users and messages will pay off for Sun.

"Anything they can do to boost that would be smart, because most [large companies] are trying to centralize all their e-mail systems," said Robert Massey, an engineering systems administrator at Wright Medical Technology, Inc., in Arlington, Tenn.

Also reportedly included in SIMS Global Business Edition are:

- Integrated support for the Lightweight Directory Access Protocol (LDAP) that will save customers from having to buy and administer both an e-mail server and an LDAP directory.
- Automated Java-based administration tools that will help network managers handle the larger user loads made possible by the server's expanded message store.
- Support for S/MIME, despite the proposed security standard's recent derailment from the Internet Engineering Task Force's standards track. ■

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Java Chip

Continued from page 8

chip designs to be ready for chip manufacturers by year-end, with samples of finished chips available to systems designers in late spring or early summer of 1998.

These chips will be based on SME's picoJava technology. When a programmer writes a Java application, it is translated into a form called Java byte codes. To execute, the byte codes are run through an interpreter or compiler to create instructions the underlying general-purpose CPU can understand. SME's picoJava is a way to run the Java byte codes directly in the Java CPU instead of in the software, which should speed operations. The chip technology has been licensed to about a half-dozen companies.

SME will market and sell its own line of chips, called microJava, based on the picoJava foundation. Independent semiconductor companies will build the chips for SME. The microJava chips will use Sun's JavaOS. Sometime in late 1998 or 1999, SME will introduce a high-end chip, called ultraJava, which will use a different, more advanced technology than picoJava.

IBM also is in the game with a hybrid strategy. Bill O'Leary, a spokesman for IBM's Microelectronics Division, said the company already is shipping PowerPC chips with JVM capabilities. The chips are used in IBM's Network Computer Division. He also said the division is at work on implanting a Java accelerator into its chips and should see results early next year.

One picoJava licensee, Rockwell Avionics and Communications, last week said it had produced the first working Java chip. However, Rockwell announced no shipping date or other details and is exploring the chip's use only in advanced avionics applications.

Patriot is using a technology it acquired about two years ago, including a chip design that, fortuitously, meshes extremely well with the Java language design, the company claimed. "We can sell the product for under $10 in high volumes," Morettini said. "We expect to have a performance-leading Java chip. You sure can't buy an Intel Pentium chip for under $10."

THREE FACES OF JAVA

Main ways to execute Java applications:

1. An Interpreter translates Java byte code for underlying operating system and general-purpose CPU. **Problem:** It's slow.
2. Just-in-time compiler speeds execution, but creates a machine-specific binary that can increase the size of the code by a factor of three or more.
3. Byte codes are executed, in conjunction with the JavaOS, directly by the Java chip. **Result:** Much faster speed, no code bloat.

SOURCE: SUN, MOUNTAIN VIEW, CALIF.

It is unclear whether the Java chips will be adopted by systems manufacturers, even for the Java-based network computers. Today, most network computer vendors are using general-purpose processors, such as the StrongARM from Digital Equipment Corp., or in some cases Intel Pentium chips. "We're tracking the Java chip, but the issue is what is its performance really compared with a general-purpose RISC CPU?" said James Fulton, director of product marketing for Network Computing Devices, Inc., a Mountain View, Calif., network computer vendor. "And will there be applications that need this specialized hardware?"

Despite the different chip architectures and the different operating systems running on them, the vendors at least do not foresee serious problems with Java's write-once, run-anywhere promise.

That is because the implementations of the JVM are much more mature now; Sun has incorporated a vast number of new testing features into the JVM, said Harlan McGhan, technical marketing manager for SME. ■

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JavaOS almost ready to load

Like any other microprocessors, Java chips need an operating system. For Sun Microsystems Inc.'s upcoming microJava chip, that means the company's long-awaited and overdue JavaOS.

The wait should be over soon: Sun is in the final stages of testing and certifying the first general release of JavaOS, based on Version 1.1 of the Java Development Kit. A "developer's release" of JavaOS has been available since November 1996 with the earliest pilot version of Sun's network computer, the JavaStation.

Sun has delayed the JavaOS release at least somewhat to fix software bugs, improve performance and add new features, according to a Sun spokesman. Another effort has been to compress the current 4.5M bytes of code to 2M bytes.

—John Cox

Browser beta bug whacks Web

By Sandra Gittlen
Redmond, Wash.

Microsoft Corp. said it has fixed a bug in Internet Explorer that has brought some Web servers to their knees.

The bug, contained in Explorer 4.0 betas posted on the World Wide Web, allowed users to subscribe to nearly unlimited Web pages. When a user subscribes to a Web page, Explorer sends out a robot to automatically cull the data and store it on the local drive. But because users could specify how far down to follow the links and how often, Explorer was collecting massive amounts of pages in short periods of time. In addition, the robot was not obeying a file regularly placed on sites, called robots.txt. This de facto Web standard can disallow the use of robots.

Because some beta users were implementing the subscribe feature, Explorer overwhelmed a number of servers, including those of Network World Fusion and MIT/Whitehead Institute's Genome Project.

Lincoln Stein, former site administrator for the Genome Project, said he tested a preview release of Explorer and found that it was not obeying robots.txt. It swamped his site with requests for pages at a rapid pace.

Explorer also was not following fetch etiquette. Normally, browsers wait a few seconds between page requests. "Explorer also didn't implement a delay, causing it to fetch pages faster than human beings normally browse," Stein said.

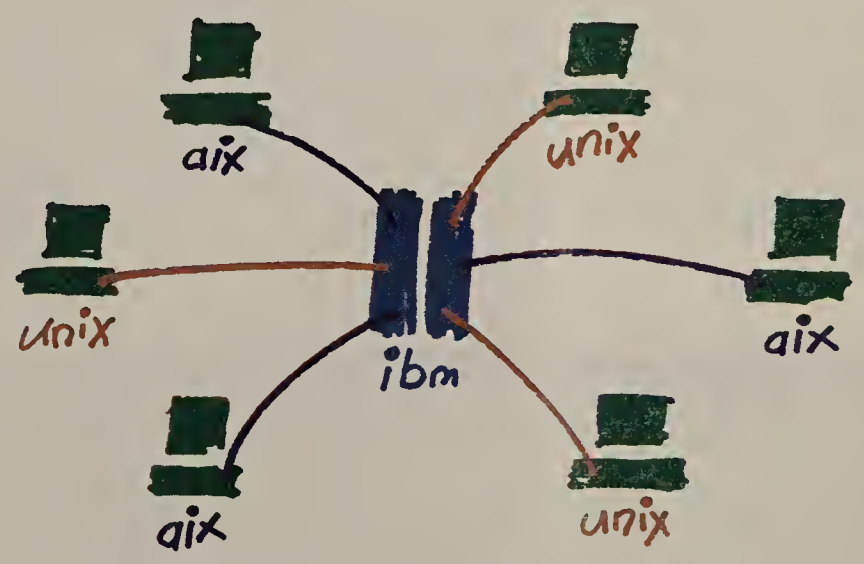
Jean-Olivier Holingue, Web technical manager for Network World Fusion, said the same problem happened on the Fusion site. A user had set the subscribe feature to check the site for pages every three seconds. "During seven days, we received 50,000 page requests from that user," Holingue said. Again, Explorer had ignored the robots.txt file that disallowed robots.

Pointing to another critical gaffe, Stein said some pages are hyperlinked to Common Gateway Interface (CGI) scripts that, when initiated, could potentially modify databases or choke servers.

Microsoft should know, since it happened to the company. According to Hadi Partovi, lead program manager for Internet Explorer, an internal testing of the product led the robot to follow links that were misconfigured to delete pages.

Partovi confirmed that the preview release did not support robots.txt, but said the general release of 4.0, scheduled for Sept. 30, does.

Holingue said a short-term fix would be to put a CGI script on the site that would check for repeated hits from the same username within a certain time frame and block that user from accessing the site. ■



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Milan

Continued from page 8

stabilize before shipping the product early next year. Some analysts think these statements are a smoke screen designed to hide the possibility that Granite's technology was not all it was cracked up to be.

"As soon as they announced the Catalyst 5500 [last spring] and said they were waiting, we pretty much knew that they were blowing smoke at us," said Craig Johnson of Current Analysis, Inc., of Ashburn, Va. "We had heard rumors that they were having challenges in folding the Granite stuff into the architectures they were looking for."

Some analysts believe Cisco has been back to the Gigabit Ethernet drawing board.

"It's taking a long time to deliver the fruits of that acquisition," said Nick Lippis, president of Strategic Networks Consulting, Inc. of Rockland, Mass. "With all the information we have, or lack thereof, it seems to me that [another acquisition] is not an outlandish possibility."

Cisco will demonstrate Granite technology at NetWorld+Interop 97, said Nate Walker, Cisco product line manager for high-speed switching.

While Cisco fiddles with Granite, the company hammers away on the Milan project. According to users and analysts briefed by Cisco, Milan is based on a crossbar switching matrix, similar to the one at the core of Cisco's 12000 Gigabit Switch Router (GSR) for Internet service providers.

Indeed, some believe Milan is the GSR scaled down and priced for campus backbones. Cisco seems to corroborate that.

THE PIECES OF 'MILAN'

Cisco's Milan, a multilayer, multigigabit intranet switch, comprises:

- Layer 3 routing
- Access lists
- Resource reservations
- NetFlow Layer 3 switching
- IOS services
- NetFlow management
- Multigigabit switch fabric
- Congestion control
- Quality of service

"We'll take [GSR] technology, accelerate it and get it in the right price range for the campus," Walker said. When asked specifically if Milan is the campus GSR, Walker replied, "I understand the question, but I can't comment on anything under development."

The first release of Milan is expected to ship next year at 20G to 40G bit/sec. Subsequent configurations are expected to scale from 50G to 100G bit/sec. Milan will require new LAN switching modules because the Catalyst 5000 and 5500 modules connect to a bus-based backplane.

Also expected next year, and to be on display at NetWorld+Interop 97, is a NetFlow Feature Card for the new Catalyst 5000 Gigabit Ethernet supervisor module (*NW*, July 28, page 24).

NetFlow is key for scaling Cisco nets to gigabit speeds because it provides wire-speed Layer 3 forwarding in the tens of millions of packets per second and applies Cisco IOS network services, Walker said.

It may take some doing, though, to convince users that NetFlow really delivers.

"I have yet to really see the benefits of it," said John Dundas, project manager for CITnet 2000 at the California Institute of Technology in Pasadena. "I haven't seen the promise of increased throughput really met with that technology."

Perhaps NetFlow needs the new Gigabit Ethernet modules in order to perform. The new supervisor module, upon which the NetFlow Feature Card sits, will sport Gigabit Ethernet uplinks. It will be augmented by 12G bit/sec Gigabit Ethernet and Gigabit EtherChannel switching modules for the Catalyst 5000 line.

The supervisor module is slated to ship in the first quarter of 1998, while the switching modules are scheduled to ship in the first half of 1998. B.V. Jagadeesh, vice president of engineering at Exodus Communications, Inc., of Santa Clara, Calif., is expecting his beta shipment in four to six weeks. ■

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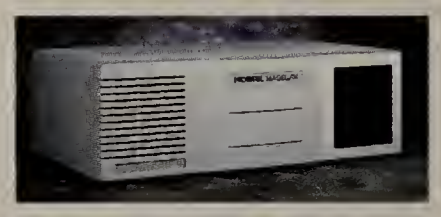
Nortel

Continued from page 10

lines, said Tony Rybczynski, director of strategic marketing and technology for Nortel's enterprise network division.

Available now, the 4430 and 4450 range in price from $3,500 to $25,000, depending on configuration.



Nortel's 4400 *frame relay access devices support voice.*

Nortel also is introducing a new T-1 voice card for its Passport ATM switch that boosts the switch's voice compression capabilities from 4-to-1 to 8-to-1 by using standards-based CS-ACELP compression. It will be generally available in the second quarter of next year. Pricing was not available.

Nortel next week also will introduce availability of inverse multiplexing of T-1 ATM lines for its Passport ATM switches. The inverse multiplexing is enabled by a new card that can bond up to eight T-1 lines together to form a single, large-capacity pipe.

The inverse-multiplexing capability lets users develop broadband connections without buying full 45M bit/sec T-3 services.

Pricing of the eight-port cards was not available.

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Special Advertising Supplement

September 29, 1997

Implementing a Frame Relay Network

Written by Thomas Jenkins
of TeleChoice, Inc.

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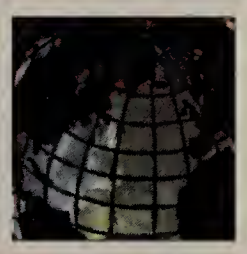
Table of Contents

Ensuring frame relay's future

4 Frame relay has become the intelligent choice for support of business-critical networks. Here's how one organization is making sure that it grows in accordance with international standards.



It's not just transport anymore

6 Frame relay has evolved from providing basic data transport to supplying value-added network services. Unfortunately, this makes choosing a service provider even more difficult.

Haste makes waste

22 The process for selecting a customer premises equipment vendor as well as the right equipment and configurations can take months. But rushing the decision can have disastrous results.

CASE STUDY:

Checking up on your carrier

16 A school district learns that when you buy frame relay service, it's important to be able to check that you get what you're paying for.

CASE STUDY:

Jeweler finds a gem in frame relay

24 A chain of stores that uses dedicated lines to transmit sales data to its home office switches to frame relay because of its ability to blend voice and fax traffic seamlessly.

ABOUT THE AUTHORS OF THE ARTICLES IN THIS SUPPLEMENT:

Thomas Jenkins is a leading expert in both the broadband and Internet services arenas. As a broadband consultant with Verona, N.J.-based TeleChoice, Inc., an authority on telecommunications issues, he analyzes service provider offerings in domestic and international broadband markets. He has delivered seminars and presentations internationally on frame relay and a range of broadband and Internet topics. He also consults on an ongoing basis with both carrier and end-user organizations.

Lori Dreher is president/chairwoman of the Frame Relay Forum. She is also a product-line manager in the Advanced Multimedia Communications Systems organization of Lucent Technologies, Inc. in Concord, Mass.

ILLUSTRATIONS BY JANE STERRETT/SIS

The smart choice for critical network support

BY LORI DREHER

Over the past few years, the use of frame relay in both public and private networks has grown at an astonishing rate — not just consistently exceeding forecasts, but substantially so. Companies of all sizes have found frame relay to be a perfect fit for a variety of business and technical applications, including LAN interconnect, SNA migration, Internet access and, increasingly, the transport of voice and video.

One factor leading to successful use of frame relay technology has been the work of the Frame Relay Forum, an association based in Fremont, Calif., comprised of equipment vendors, network service providers, users and consultants. Formed in 1991, the group is committed to the implementation of frame relay in accordance with national and international standards.

The forum's Technical Committee defines Implementation Agreements (IA) that specify the various aspects of communications procedures involved in the technology. Committee members work as a team to anticipate industry requirements and to define the underlying communications procedures.

IAs range from describing basic communications procedures between customer premises equipment (CPE) and frame relay switches for permanent virtual circuits (PVC), to more complex procedures such as those required to support seamless interworking between frame relay equipment or networks and newer complementary technologies such as ATM. IAs define a baseline for multivendor interoperability, ensuring maximum flexibility for network topology and configuration. Frame relay equipment vendors and service providers can choose to implement some or all of the IAs, as well as differentiating their offerings through "value-add" features.

Market demand for products/services based on the technology may impact the rate at which equipment vendors or service providers implement support for certain IAs. A case in point is widespread support for frame relay switched virtual circuits (SVC). Although the forum ratified the IA for SVCs in 1994, only recently have companies begun to market this functionality — possibly to address demand driven by increased use of business applications (such as voice or multimedia) that require temporary communications between a variety of source/destination sites rather than permanent predefined connections.

As the frame relay market continues to grow, the combination of increased availability of infrastructure, services availability and interoperability with legacy and complementary technologies ensures that it will remain an intelligent choice for support of business-critical networks.

WHEN CHOOSING A SERVICE PROVIDER REMEMBER:

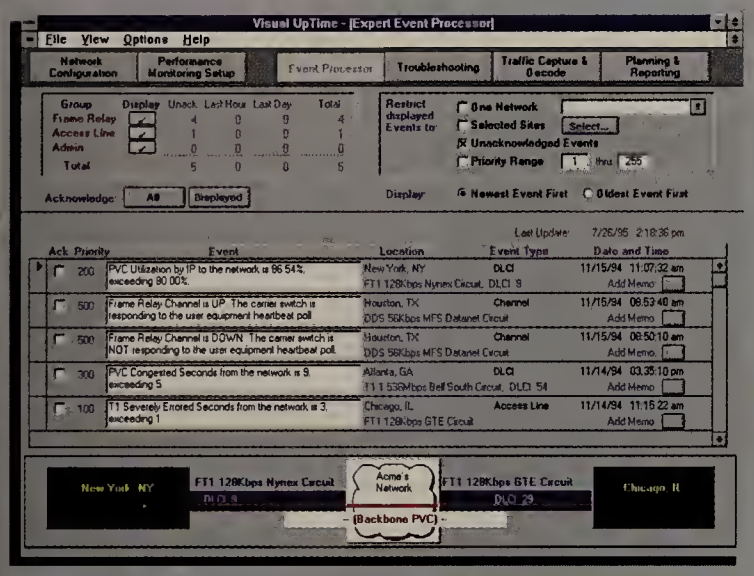
It's not just transport anymore

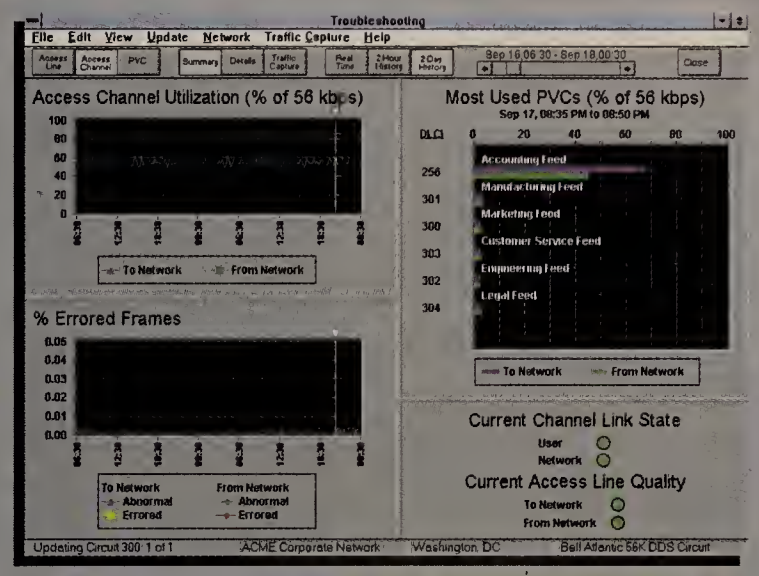
BY THOMAS JENKINS

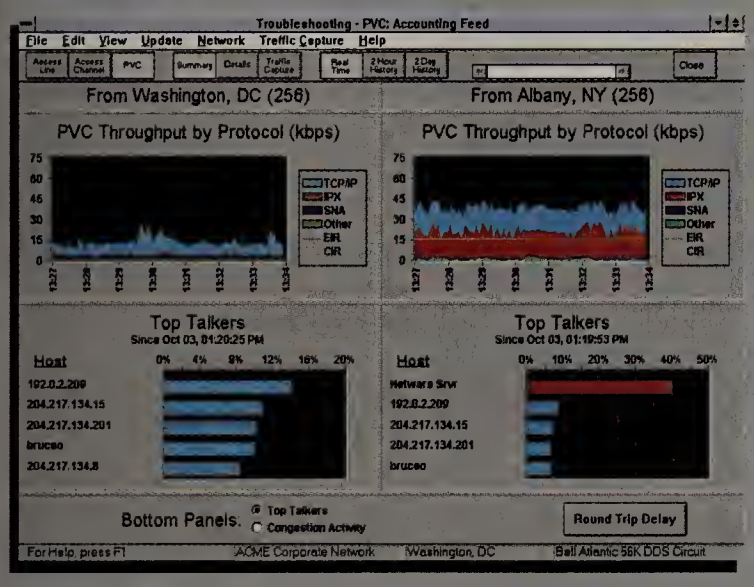
Over the past six years, frame relay services have gone from simply providing basic data transport to supplying value-added network services. Although this evolution has added to frame relay's attractiveness for all kinds of customer environments, many organizations — even those for which frame relay is a good match for their communications needs — have not yet deployed the technology. Maybe your company is one of them.

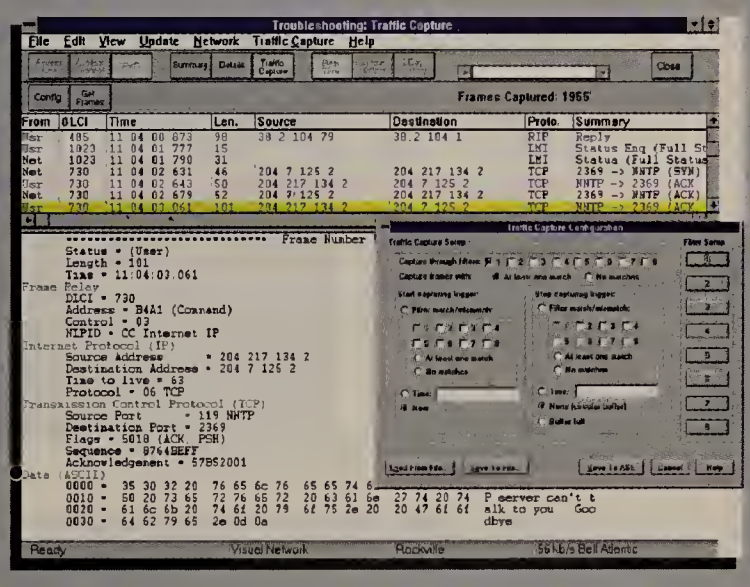
Why is the decision to go to frame relay so difficult? Evaluating frame relay for your network, then choosing the best provider given your requirements, is hard, but four factors make it even harder.

See What You've Been Missing...









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1. THE EXPLOSION OF SUPPLIERS

The popularity of frame relay has encouraged many local, regional, national and international providers to enter the marketplace. This is a blessing because it gives you leverage in negotiating your contract. It's also a curse because there are so many choices. To avoid information overload, limit your search to five providers.

2. THE PROLIFERATION OF FEATURES

With more available switch platform capabilities, providers are introducing services almost monthly and are constantly modifying services such as SNA, voice, customer network management services (CNMS) and managed network services (MNS). To cut through the hype, list your current and future requirements on one piece of paper and the capabilities of each service provider on another. You're likely to find three to five providers that meet your requirements best. Also, make sure you get the throughput you are paying for on specific platform types. For example, if you order an AT&T 56K bit/sec line, there is 8K bit/sec of overhead bandwidth, so you may get only 48K bit/sec of usable bandwidth.

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Back in the days when private-line services ruled the world, you could select Carrier A to provide Circuit 1 and Carrier B to provide Circuit 2. But with frame relay, this is no longer an optimal solution. You should use the provider you select for your entire network . . . which makes the selection all the more important.

4. THE CHANGE CARRIES AN ECONOMIC IMPACT

When deploying a frame relay network, you'll have to cover training costs for your staff (unless you order an MNS) and new CPE costing thousands of dollars per site. You'll also have to plan your network conversion carefully to minimize its impact on day-to-day operations.

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A vendor providing a fully functioning frame relay service should offer:

- ✓ Multiple port and permanent virtual circuit (PVC) increments
- ✓ Mean time to repair (MTTR) targets of less than four hours
- ✓ Network availability goals of at least 99.95% (and know what's covered — just the carrier's network, or the end-to-end service, including the local loop)
- ✓ Multiple access options, including 56/64 K bit/sec and DS-1/E-1
- ✓ Documented processes for delivering service and addressing trouble tickets
- ✓ 24x7 network operations center
- ✓ The ability to meet your billing requirements (i.e., usage-based billing, foreign currency or billing by cost center)

When writing your **contract** document all service expectations from the provider, such as performance guarantees, billing capabilities and availability promises. A well-written contract will allow you to switch providers if your carrier fails to deliver on those promises.

Frame relay services now offer much more than basic transport. You can subscribe to value-added services, such as managed network services, application-based services, CNMS and disaster recovery services.

How long-distance and local providers differ

Geographic coverage: Local providers can support your network if it is primarily within a metropolitan area.

Switch concentration: Local providers generally have multiple switches in each metropolitan area. Some long-distance providers only have one switch location per metro area, but many switches in the region or nationwide. Others may only have switches in regional geographies.

Pricing structure: In most areas, local providers have port and permanent virtual circuit (PVC) charges, but do not charge based on the subscribed bandwidth. Long-distance providers also have port charges, but usually add a charge based on the bandwidth of the PVC.

Pricing: Local providers have lower backbone costs, so their overall pricing tends to be lower than that of long-distance providers.

Port speed increments: Long-distance providers usually offer more port speeds than local providers.

Breadth of options: There has historically been more competition in the long-distance market, so these providers have more service options.

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Should you **trust** your service provider to manage your network? Subscribing to an MNS allows you to reassign or reduce your network staff and focus on your core business. On the other hand, managing your own network gives you greater control and understanding. Your decision on which way you go should be based on the following four considerations:

1. Does the service provider include your preferred equipment vendor in its MNS offering? Most providers support only certain equipment, which limits your network options. Don't be pigeon-holed into using CPE that does not meet the specific needs of your applications.

2. What network elements can a provider manage? Some vendors manage to the DSU/CSU, some to the router/frame relay access device (FRAD), while others take **responsibility** all the way to the LAN.

3. Which protocols does the MNS offering include? Many providers limit services to IP and possibly IPX, along with an Ethernet interface to your WAN. If you're running SNA or voice over your frame relay network, an IP MNS will not provide the solution you're looking for.

4. What does the provider offer? Ideally, it should offer many of the following:
   - 24x7 monitoring
   - Network design assistance and installation support
   - Network performance reports (Web, hard-copy, SNMP)
   - CPE maintenance options (two-hour, four-hour, and next-day are common)
   - Service guarantees that assure a high level of performance (is it only the inter-exchange carrier or local exchange carrier on-net, or is it end-to-end?)
   - Proactive network analysis (continuous evaluation for possible changes)

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The more your network grows, the more difficult it can be to ensure a secure, cost-effective enterprise. This is especially true when you expand into the wide area environment. How can you be sure that the solutions you choose today will fall in line with your organization's big picture? That's why you should make a connection to Cabletron and our integrated Netlink frame relay switches.

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CABLETRON SYSTEMS

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Many vendors offer frame relay services to support specific customer applications. Examples include SNA and voice-over-frame relay services. These application-based services may simply be a managed service, where the provider manages a FRAD on your premises. Or the services may utilize advanced equipment at the provider's point of presence (POP) to provide extra support for the application.

Familiarize yourself with the added network capabilities available to support your specific application. How is the network treating application traffic differently? Is the provider willing to guarantee the delay and throughput performance you need? Do the provider's technicians understand the higher network layers of the application? Are there any special procedures and capabilities?

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Ten tough questions to ask carriers

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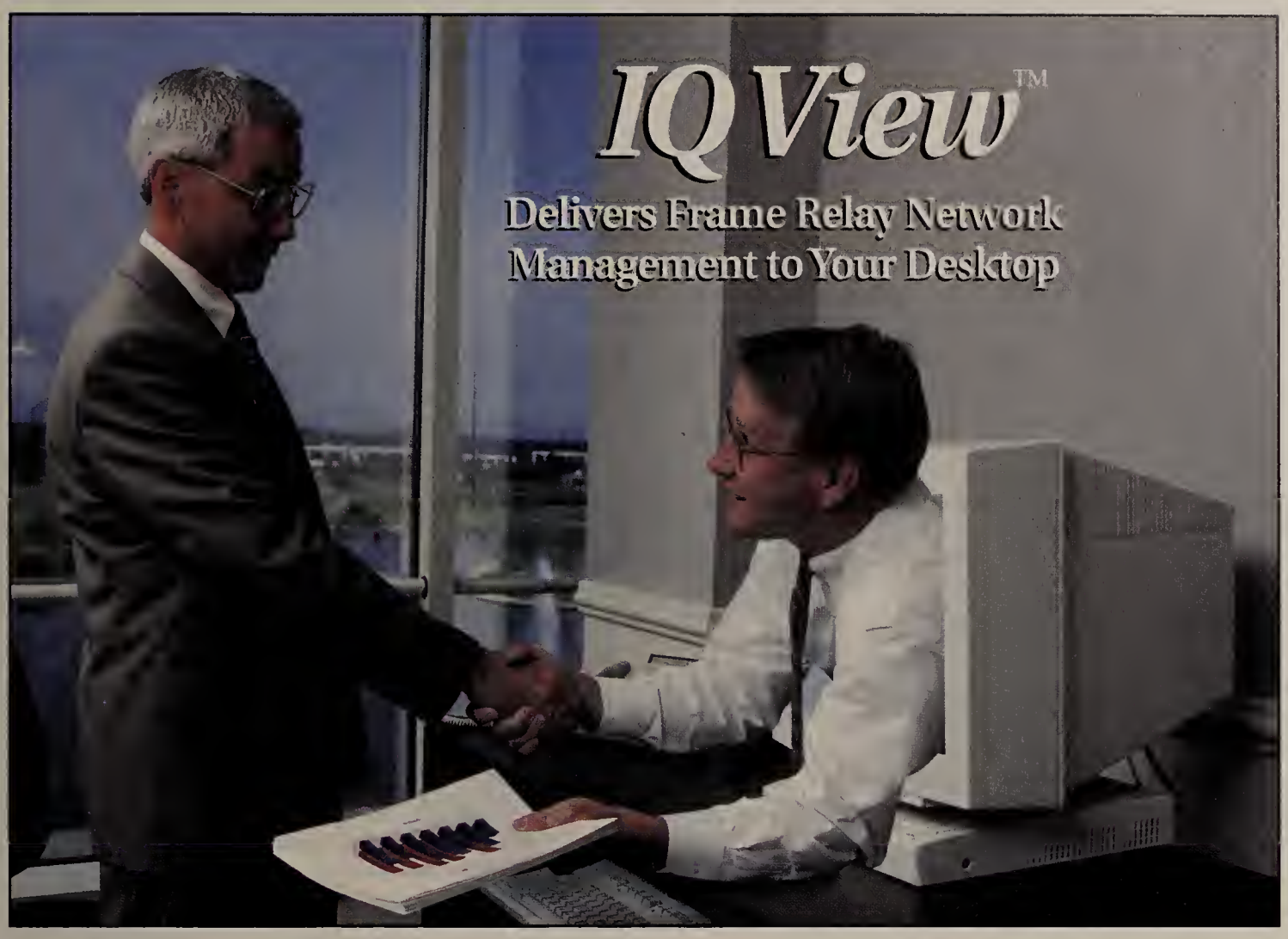
2. If I am under contract for two years, and your prices go up, will my rates increase during the two years or only upon contract expiration?
3. Do other data services aggregate with frame relay for revenue discounts (and vice versa)? Does voice revenue aggregate with data revenue?
4. How do you handle traffic bursts? How do you assure fairness?
5. Are all services provided by your company, or are some provided by partners? How do you manage those partners?
6. Can I migrate to other services (enhanced services or new technologies, such as ATM) without penalty?
7. What are your service backup and recovery capabilities? What guarantees are associated with each protection plan?
8. Can you provide three reference accounts with similar applications and networks to mine?
9. What tools do you provide, and at what cost, to monitor service-level agreements (SLAs)? Do you self-enforce these SLAs, or is that my responsibility?
10. Do you have customer guidebooks that explain your basic service, MNS, CNMS and other value-added services, as well as the process for installing and delivering these services?



Need information on how your Frame Relay Network is performing? Now you can have it delivered right to your desktop. ADTRAN's new ***IQ View***™, Frame Relay management software and the IQ family of DSU/CSU's, allow you to monitor the performance of Frame Relay circuits from any PC or SNMP management system. Utilizing non-intrusive in-band management, the Windows '95™ compatible ***IQ View***™ software provides comprehensive realtime measurement of each PVC for T1/FT1 and 56/64 Kbps Frame Relay circuits. And since the IQ products are based on SNMP standards, they can be used with existing SNMP network management platforms and other trend analysis tools. For more information on how you can get Frame Relay network management delivered to your desktop, contact us at 1 800 9ADTRAN or visit us at www.adtran.com.

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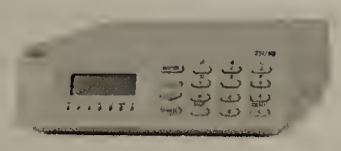

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CASE STUDY

School district strives to keep carriers honest

Cherry Creek School District #5 in Englewood, Colo., has discovered that when you buy frame relay service, it is vital to be able to check that you get what you are paying for.

When Cherry Creek ran into problems with a frame relay circuit, it had no way to verify whether the carrier was delivering the minimum bandwidth the district had purchased. To check what committed information rate (CIR) was being delivered, the district chose ADC Kentrox DataSmart DSUs/CSUs with Frame Vision software for monitoring network performance.

With the smart devices, the district hopes to gather data it needs to keep carriers honest. In addition, traffic information provided by the gear can be used to plan when and where to add bandwidth as the frame relay network grows.

The district's wide-area connections among school buildings evolved around dedicated lines which it needed to connect remote users to centralized IBM mainframes. But newer applications, including Internet access and educational sharing, required a network that was better meshed.

More dedicated line was not an option. "The price of the hardware to do point-to-point circuits everywhere would kill us," said Gregg Foley, senior network analyst for Cherry Creek schools.

So in the spring of 1996, the schools ran full 1.5M bit/sec frame relay connections into each of four high schools in the district. The T-1s are fed by traffic from 14 other schools, five of which have 56K bit/sec connections and the rest with 112K bit/sec fractional T-1 circuits. Some of the old SNA mainframe traffic is riding over the frame relay network encapsulated in IPX packets.

Things ran great until this spring when one circuit into the district's purchasing department started dropping SNA sessions that were being run over a 112K bit/sec frame relay link. The carrier, US WEST, Inc., said the problem was internal to the Cherry Creek network. 3Com routers at the schools were letting data blast at 1.5M bit/sec to sites that had only 112K bit/sec connections, US WEST told Foley.

Foley acknowledged that US WEST might be right, but the carrier would not give him records about traffic on the circuit to verify the claim. "They were very guarded in the information they would give out," he said. He started looking for a way to check circuit load and performance himself. The district was already using earlier generation Kentrox DSUs/CSUs, and Kentrox had just introduced its DataSmart devices, he said.

With these devices coming online, Foley will be able to track peak use of each circuit. "When US WEST says I'm at 400% of my circuit, it gives me the avenue to come back and say, 'My DSU/CSU tells me that this is all that is coming out of my site,'" he said. The same information can be used to see which links are nearing capacity and may need to be enlarged, he added.

The district has one DataSmart DSU/CSU at each high school, but may buy more units to get a more complete picture of how the network is performing. "As we get more reliant on frame relay, it's something we'll want," Foley said.

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Typical Transport Service Options

Dedicated ports: 56/64K bit/sec, fractional T-1/E-1, T-1/E-1, NxT-1/E-3, T-3/E-3
Dialup ports: analog, switched 56/64K bit/sec, ISDN Basic Rate Interface
Reserved PVC bandwidth: 0 CIR PVCs, CIR PVCs
Oversubscription: none to unlimited

Customers who decide to manage their own network or wish to keep tabs on the performance of their MNS provider can benefit from a customer network management service (CNMS). A CNMS allows you to view performance such as dropped packets, packet delivery rates, network availability and other metrics.

Before subscribing to a CNMS, determine if you have the time and expertise necessary to review the reports and to follow up with the carrier on any issues. Ask potential providers how broad a network view you'll have. Some providers can only provide information from their backbone networks, while others can offer views all the way to your premises, even into managed equipment.

There are three types of CNMS. Not all are available from each provider.

1. Hard-copy reports sent out periodically for a small fee. You won't need additional equipment, software or permanent virtual circuits (PVCs) under this option.

2. A network management view from an SNMP terminal with software such as HP OpenView. The information you'll get on network performance and configuration as well as traps will be five minutes to an hour old. Often, you'll be able to electronically submit trouble tickets. SNMP services carry a charge and require a PVC from the service provider's monitoring site to your operations center.

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If yes, how soon? _____

How many branch locations are in your network? ❑ 1-50 ❑ 51-100 ❑ 101-250 ❑ 251-500 ❑ 501+

Your role in the decision process: ❑ Identify/specify needs ❑ Recommend purchase ❑ Evaluate vendors
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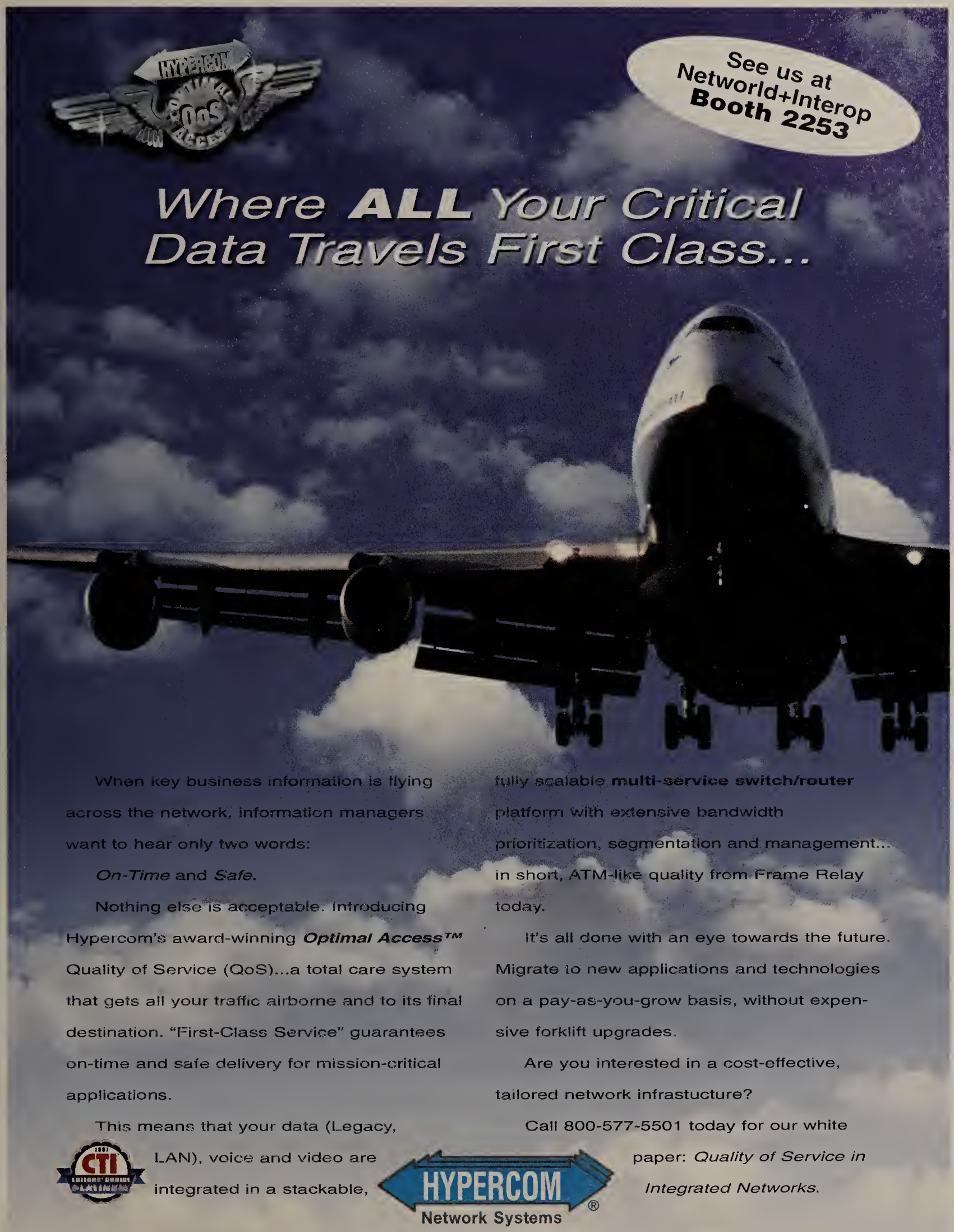

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3. Web Access: A network management view from a Web browser. This most recent addition to the CNMS service family is easy to use and can relay information in near real time. You'll find predefined reports that you download or view on your screen. A handful of providers currently offer this service.

A disaster recovery service will allow you to keep critical sites up and running in the event of a port, access or equipment failure. You can choose disaster recovery services at only backbone hub locations or at every frame relay site. Pricing is available as a flat monthly fee or a per-use charge.

There are two kinds of disaster recovery services: access recovery and site recovery. Access recovery protects against access line failure by providing backup access facilities through switched 56K bit/sec, ISDN or diverse dedicated access. With a site recovery service, if your site experiences a failure, all traffic to that site will be rerouted to a secondary site through an alternate logical connection. This secondary site could be another site on your network or a disaster recovery service provider.

(When evaluating these services, ask your provider if the switch to the alternate path happens automatically, how long it takes and if the circuit automatically switches back to the primary path after restoral.)

Although the evaluation of frame relay services may seem like it will be a daunting, time-consuming task, users who go through this process are rewarded with a network that performs better at a lower cost than their existing one. When selecting a provider, don't just look at its raw transport capabilities. Its value-added services can greatly expand the benefits that frame relay brings to your organization.

Avoid unnecessary bandwidth investments and identify WAN problems fast. **FREE CD** shows you how.

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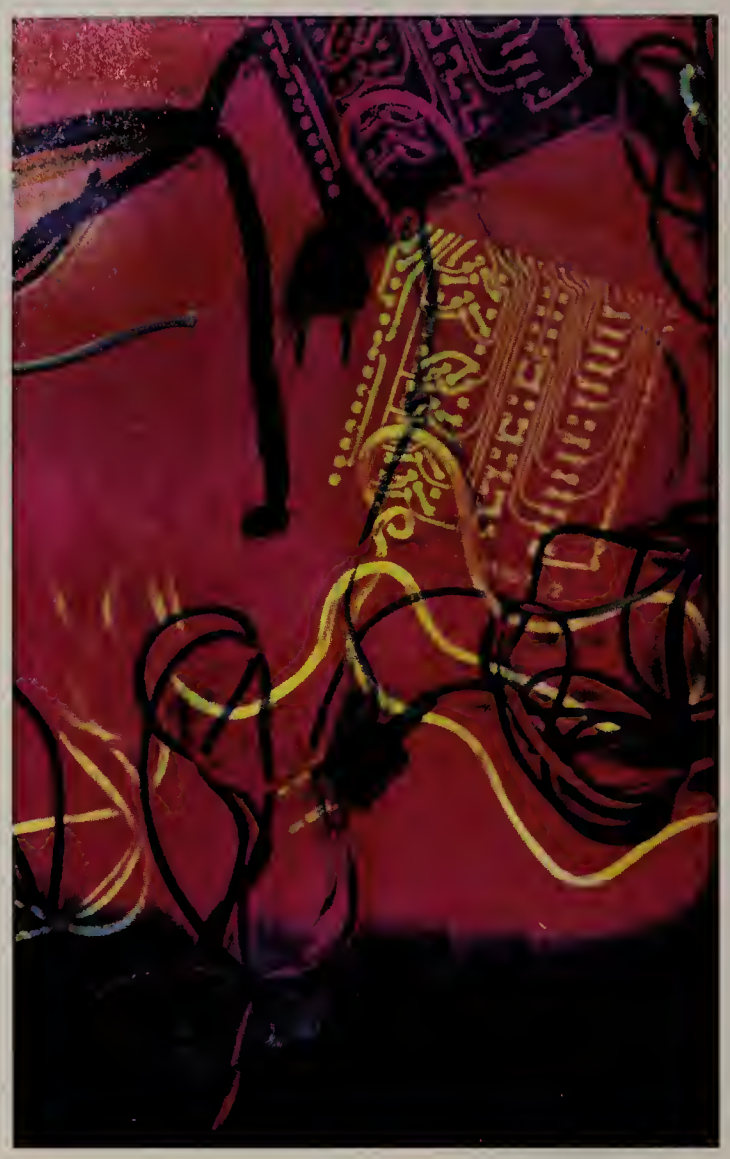

SELECTING AN EQUIPMENT VENDOR:

Make the Decision for the Long Term

BY THOMAS JENKINS

Customer premises equipment (CPE) plays a key role in assuring performance of applications and efficiency of a network. When selecting CPE, you'll need to spend time exploring capabilities and options, especially if your frame relay network is going to be complex. CPE vendors often are the first to support new applications, long before any carriers "productize" services for specific applications. For instance, SNA, voice and network management applications have had CPE-enabled solutions for years.

Only recently have providers introduced services specific to the

Continued on p. 31

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CASE STUDY

Frame relay sparkles as solution for jeweler

With about 100 stores in 14 states throughout the South, Reed's Jewelers had a lot of information that needed to get to its home office in Wilmington, N.C.

For years that had been done over 56K bit/sec dedicated lines bearing fax and phone traffic. But after taking a longer look at his company's communications needs, IT manager Jim Howell last year decided to explore frame relay.

Howell knew that a frame network could blend voice and fax traffic seamlessly on a single link. That was not the case with dedicated lines, which, when faxes were running, could not be used for voice, and vice versa. He also knew eventually he could add other data traffic from each store onto the frame relay network, replacing the nightly dial-up modem calls made from the home office to each store to download that day's sales data.

Because of frame relay's ability to mix different types of traffic in one line, the bandwidth on each link would be used more efficiently than on a dedicated line. On dedicated lines, chunks of bandwidth are set aside for separate applications, even when an application is idle. More applications mean more bandwidth. With a frame relay network, Howell could add the nightly data traffic without having to buy more bandwidth.

Howell hired a systems integrator to help with the project. They put out bids to potential frame relay carriers, looking for a provider with points of presence near the Reed's stores.

AT&T and Intermedia Communications, Inc. (ICI) fit well. ICI's prices were not the cheapest of the carriers who bid, but it did have a good geographic fit and was willing to let Reed's test 10 lines for three months at no charge. If Howell was dissatisfied, he could walk away free and clear.

ICI also was able to convince hardware vendor Nuera Communications, Inc. and local phone companies to take part in the trial for free — an offer Howell could not refuse. So they set up the test and tried out the system live. "They were putting their reputations on the line," he said.

The trial required intricate coordination. Local phone companies provided the local link to the ICI network, and Nuera provided the hardware that supports voice and fax. "You're not just testing lines and hardware," Howell said. "As important as any of it is the coordination and timing. They've all got to be able to work together."

There were a few glitches. Howell wanted 56K bit/sec lines to each store, but only wanted to pay for a guarantee that 32K bit/sec would be available all the time. That gave him a committed information rate (CIR) of 32K bit/sec, with the option to send more traffic up to the full 56K bit/sec capacity of the lines if the ICI network had the capacity. Some lines were installed with inadequate CIR, but they were discovered quickly and corrected, Howell said.

After the three months, Howell decided ICI's frame relay service met his requirements for availability and latency and installed lines to the rest of the stores. With the net up and working, Howell is already looking to squeeze more out of it. After the busy fall retail season, he plans to add the nightly dial-up sales data download to the frame relay network, saving $400 to $700 per month.

After that, Reed's plans to add an electronic signature system for credit card purchases. The additional traffic will be squeezed onto the existing frame network and will ride for free.

There's one great thing about being the youngest major player in frame relay. You aren't afraid to break a few traditions to satisfy your customers. Maybe that's why we've pedaled our way to the top five at the tender age of ten.

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The big boys said no one would ever guarantee frame relay performance all the way to the local loop. We said,

"Nyah, Nyah-Nyah, NYAH, Nyah."

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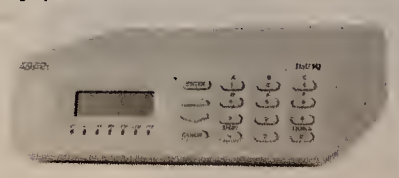

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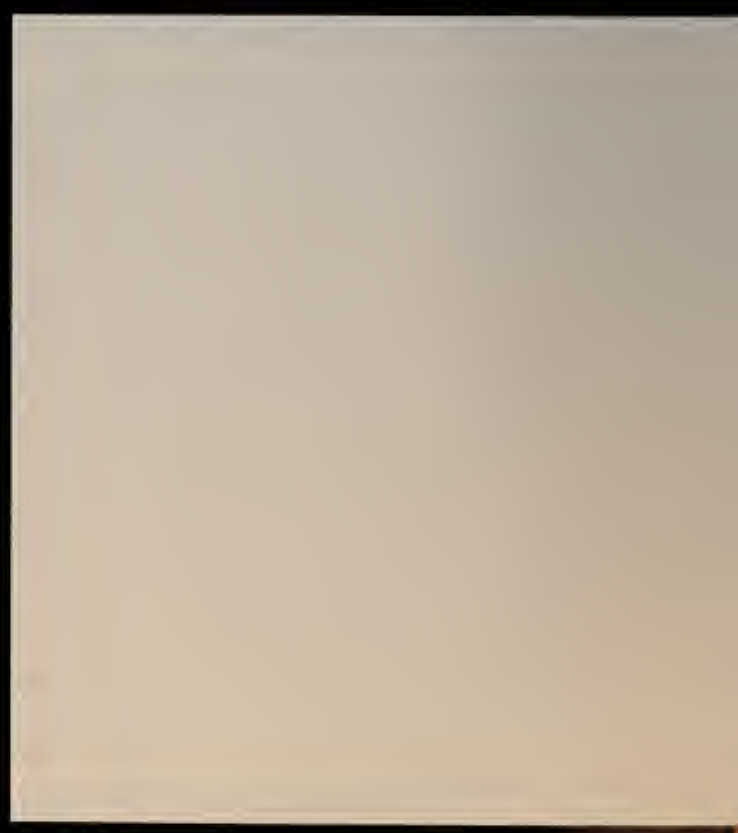

Frame Relay Product/Service BRIEF

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Before you let a company connect your business to the Internet, ask yourself, "Who connects them to the Internet?" If the answer is Cisco, your service provider's network is built with the technology that brought the Internet to business. So whether it's broadband IP, ATM or frame relay, your business will be getting networking services that lead the industry in reliability, performance and innovation.

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Marathon 5KT Pro

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Continued from p. 22

SNA market. Voice over frame relay services are still in their infancy and the amount of information you can capture in a CPE management solution is greater than what is being offered by service providers. If you want advanced functionality on your network, CPE may be the first place to look.

The process of selecting a CPE vendor(s) and the right equipment and configurations in their product family may take several months. But rushing the decision and making a poor choice could limit your applications and their performance. Below are the main considerations in selecting CPE for your network.

Deciding what types of CPE equipment you need is getting more difficult. Frame relay access devices (FRAD) and routers are merely different names for devices offering the same functionality. For example, which is better for a particular network — a FRAD or a router? An integrated DSU/CSU or separate units? Do you need CPE management capabilities? These questions have no easy answers. As a rule of thumb, the more you segment the responsibilities of each piece of equipment, the more specialized each piece is. For example, you could purchase a router that has management capabilities, supports SNA and LAN traffic, and has an integrated DSU/CSU, but the functionality of that router may not be as robust as if you installed a FRAD specific to SNA traffic, a separate DSU/CSU and a network probe. However, there are always exceptions to the rule.

Selecting an equipment manufacturer is another decision that should be made with an eye toward the long term. Installing new frame relay equipment is costly; you'll want to get as much useful life out of it as possible. Pick a vendor that can address not only your needs today but in the future as well. Of course, to project your future requirements, you'll need foresight. . . and a little luck.

Why use application-specific equipment?

The applications customers run on their frame relay networks vary, as does the equipment necessary to make certain applications run smoothly. Applications such as SNA and voice are those usually associated with the need for application-specific equipment.

To understand this need, look at voice transmission. A voice call has certain characteristics that differ from a traditional data transmission. Tone, volume, inflection, silence — all these must be conveyed in order for the distant end to fully understand the message. If you plan to run applications such as voice, SNA or others that have unique requirements, make certain your equipment vendor can support these unique needs.

Price: Deciding between a $2,000 FRAD and a $3,000 one is not easy. But there are key differences between low-cost and premium CPE. Two pieces of equipment may differ in features, interoperability or their ability to support future applications. The question is: Do you need the features today, in the near future or never?

When selecting frame relay equipment, don't automatically choose your current CPE vendor. Just because a vendor provides the best private lines, X.25 or other service doesn't mean they'll have the best frame relay solution. Many of the providers of cutting-edge technology are small companies that only offer frame relay CPE. Check out what many vendors have to offer.

When selecting a CPE provider(s), you'll need to consider features and capabilities. How vital these are will depend on the applications and critical nature of the data being transmitted. You'll want to evaluate the following:

Whether the equipment can interoperate with other CPE at each location is determined by its compliance with standards. If it is not standards-based, you may find yourself locked in to one vendor — a less-than-optimal solution, but one that could

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be necessary if the network supports cutting-edge applications.

Security and encryption prevent unauthorized users from accessing network resources and restricted information. Although many security issues are addressed in the frame relay cloud itself, you may need additional security at sensitive sites.

If the CPE compresses information, your network will utilize resources more efficiently. But compression requires higher processing power and inflates the equipment price. You'll need to use either standards-based algorithms or the same equipment to decompress the data at the distant end. Compression is an issue with voice traffic.

Network management offers a view into your network and lets you determine if the network is designed properly and how it is performing. It also can alert you to problems before they affect service.

Ten steps to selecting a vendor

1. Determine the initial and future applications your frame relay network will support.
2. List existing equipment along with current and future needs of your equipment (SNA, voice, management, speeds, etc.).
3. Group features into three categories:
   "Must have"
   "Would like"
   "I can dream, can't I?"
4. Spend a few mornings talking to different vendors, and vendors offering multiple types of equipment (routers, hubs, FRADs, etc.). This will give you a true idea of your options. Ask them the 10 questions listed later.
5. Find out what future plans/vision each vendor has — with specific time frames. Ask whether each of their developments is funded with assigned resources and a detailed development plan.
6. Talk to your future service provider. Find out how familiar it is with the equipment you are considering, and ask for an opinion. Even if you don't know if a vendor is good or bad, your provider probably will.
7. Update features in Step 2 based on additional information gathered from service providers and CPE vendors in Steps 3, 4, 5 and 6.
8. Disqualify all vendors that do not fit into the "Must have" category.
9. Ask the vendors on your shortlist to submit a proposal specific to your network and its requirements.
10. Evaluate and make a decision.

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You may want to prioritize certain applications. For example, since SNA traffic is highly delay-sensitive, the CPE should send SNA traffic before LAN traffic, but still not block all LAN traffic. This issue becomes more serious as users add applications to frame relay networks. Some service providers can prioritize traffic, but only once it reaches the frame relay cloud.

If you're running multiple protocols, you may want to install CPE that can differentiate between protocols and address the needs of each. If the protocols do not require special handling, this may not be a factor in your decision.

Reliability and performance factors are another set of criteria. These include:

CPE introduces varying delay, depending on the processing power of the CPE and whether or not it is performing advanced functions. Delay can seriously affect applications such as SNA and voice.

Most CPE can't "source quench" (slow data flow from the source), and the connection to a WAN is typically slower than to a LAN, causing traffic to back up. Therefore, the CPE must have buffers. You'll have to estimate your traffic patterns to determine how large a buffer you'll need.

Packet throughput measures how many packets the equipment can handle in a unit of time (usually one second). This is a good metric for comparing vendors.

Some CPE offers hot-swappable cards, which allow you to replace damaged or outdated cards without having to reboot or disconnect the CPE. If your CPE supports a mission-critical function, you'll want this feature to minimize network outage. Another option for mission-critical applications is CPE redundancy. The most com-

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monly protected components are switching or routing fabrics, centralized processors and power supplies. Most redundant configurations require you to buy each extra card, but the price is worth the expense if you can't afford network downtime.

Remote programmability gives a service provider, network manager or your vendor's support group access to the CPE for solving problems or making changes. This feature is substantially less expensive than paying for travel to your smaller sites, and it's more responsive. Most CPE today is remote programmable.

Processing power determines how many functions your CPE can support. Protocol translation, address resolution, compression and other advanced network functions all drain processing power.

The needs of your network and frame relay technology are changing

Ten tough questions for equipment vendors

1. Can you describe other networks of size and application needs similar to mine that you have supported?
2. Can you give me references for three existing customers who are using the same applications I'm running?
3. Ask for details on their technical specifications. Switch backplane speed? Size of buffers? FIFO or shared memory? Number of queues and queuing mechanism?
4. Ask for a demonstration of the network management system — on live traffic, not a demo disk.
5. What technical support is available? Is it 24x7? Is there a charge? Will you help me design my network to work optimally with your equipment and evaluate my solution on an ongoing basis?
6. Do you have support offices near my locations? How many people are in each office?
7. How quickly can I get spare parts (hours, days, etc.)?
8. What is your experience at the application level (i.e., can you help me get Lotus Notes up and running)?
9. What are your hardware and software upgrade protection policies? How long will you support certain hardware/software versions? Four years? Six? Until the next version is introduced? What is your process for getting new software upgrades to your customers — online, CD-ROM, etc.?
10. Have you completed interoperability testing with my other vendors?

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fast. Be sure that the CPE you deploy is easily scalable and upgradable. Factors in this decision include:

Your vendor should offer multiple WAN interfaces such as 56K bit/sec, DS-1 ISDN, frame relay and ATM. You'll want to look for vendors that also support a variety of LAN interfaces such as Ethernet, token ring and FDDI.

If your network is very complex, with multiple paths between locations, you'll want a sophisticated routing algorithm. If not, you can get by with a basic algorithm.

Vendors are constantly modifying the software on their equipment. As new software versions come out, you'll have to upgrade your CPE. This could affect service unless your vendor provides nondisruptive software upgrades. If you can live with having a site down for a short period, this may not be a major concern.

If you have the ability to monitor your network, or want an outside party to perform this task, you'll need to install CPE with network management capabilities. You can have your router, FRAD, DSU/CSU or a network probe perform these functions. Here are some issues for prospective vendors:

Standards compliance: Standards-based network management tools offer interoperability between equipment, and, therefore, flexibility. Proprietary tools are based on standards, but add enhanced features that are not standards-based. Once you determine the features you require, see if a standards-based solution gives you everything you need. If not, look at some proprietary solutions.

Real time vs. nonreal time: A benefit of using a CPE network management solution is that the information you receive is typically closer to real time than most ser-

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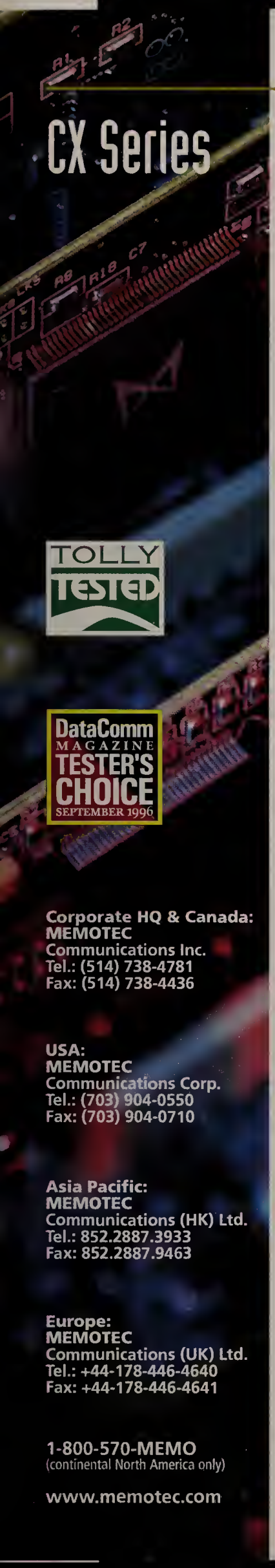
vice providers' CNMS, where the information is delayed 15 minutes to a few hours. Some CPE have management capabilities that can provide greater insight into the performance of specific applications. This can give you highly granular information, such as the ability to view who your heaviest user is, which Web sites are being accessed and which protocols are being used most. If you have the resources to review and act on this information, select a vendor that delivers these features.

CPE with management capabilities should provide information for tracking service-level agreements, troubleshooting network problems and evaluating your service provider's overall network performance. If your provider has agreed to give you 99.5% packet delivery, you'll be able to track this type of information and determine if this level is achieved. If not, you may be due a service credit.

Select a vendor that can provide training, equipment documentation, ongoing technical support and on-site assistance. No matter how easy a vendor says the equipment is to install and maintain, at some point you'll need help. Each vendor has different customer assistance packages (they usually carry a fee), so ask for all options (pay per contact, pay more for one-hour response vs. next day response, flat monthly fee).

When comparing equipment, look at the long-term cost of ownership. A piece of equipment may be less expensive, but if it takes you twice as long to configure it, and it ends up not being scalable to meet your future needs, its actual long-term cost may be higher. You might want to purchase a hardware maintenance plan or a software support contract.

If you still think that purchasing CPE or installing and maintaining it are beyond your corporate capabilities, you could use a managed frame relay service from your provider, a CPE vendor's management service, or outsource the responsibility for the entire network. All are viable solutions.



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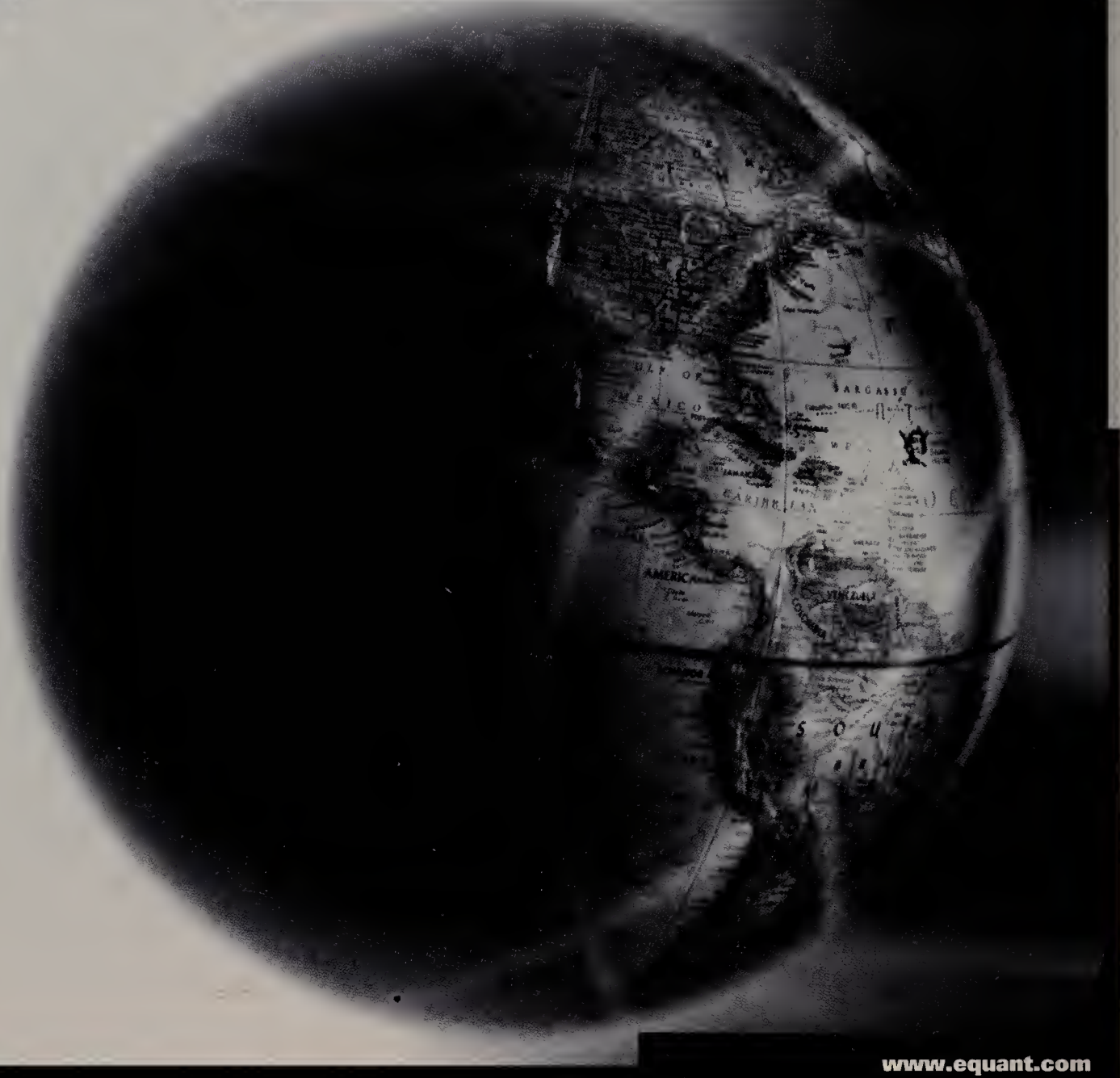

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Switch start-up readies LAN/WAN integration device

OneBox Networks rolls out wire-speed switching, IP/IPX routing, WAN access and firewall components all into one box.

By Jodi Daniels
Westlake Village, Calif.

OneBox Networks, Inc. thinks it has one up on its LAN switch competitors, but some observers say the company is just one more start-up in a crowded market.

The company — which will make its debut next week at NetWorld+Interop 97 in Atlanta — has taken an all-in-one approach to differentiate itself. The company will unveil a pair of pioneer products, the highlight of which is a device that offers wire-speed switching with IP/IPX routing, ATM and Gigabit Ethernet uplinks and multiple WAN links as well as firewall and encryption features.

That is the equivalent of a Layer 2 switch, router, multiplexer and WAN access device . . . all in one box.

"This is a product that would give a network manager the opportunity to say, 'I don't need to buy three products because this box is capable of taking care of it all today,' " said Martha Young, principal at Cutting Edge Information Group, a consultancy in Golden, Colo.

And that is exactly what OneBox is shooting for.

"We like to think of ourselves as the home stereo entertainment system vs. individual stereo components for workgroup networks," said Michael Leigh, executive vice president of sales and marketing at OneBox. "And because our box would replace a lot of separate devices, it can be a lot more cost-effective."

But more than pricing, the integrated device makes things simpler for the customer, according to Esmerelda Silva, an analyst at International Data Corp., a market research firm in Framingham, Mass.

"Some customers really like the idea of a box that does it all because it really helps reduce complexity," she said. "And that causes the overall cost of ownership to come down."

The ON-100 supports a mix of 10M and 100M bit/sec switched Ethernet ports with an aggregated forwarding rate of 300,000 packet/sec. In addition, the device offers IP/IPX routing with a maximum of eight router domains.

On the WAN side, the device supports a single 56K bit/sec or T-1 interface with an optional integrated DSU/CSU. The ON-100 supports PPP, PPP MultiLink and frame relay protocols.

The device also offers firewall features, alleviating the need for costly and complex file server-based firewall applications, analysts said. Different levels of security and access can be assigned for as many as seven physically separate LAN user segments, each supporting up to 2,000 users.

In addition, OneBox will unveil a 10M/100M bit/sec autosensing Ethernet switch, dubbed ON-516. The 5G bit/sec switch supports 16 Fast Ethernet interfaces and boasts a forwarding rate of 3.5 million packet/sec.

PROFILE: OneBOX NETWORKS

Headquarters: Westlake Village, Calif.
Founded: Sept. 1996
Primary products: Layer 3 switch and router products
Funding: $6.5 million in venture funding from Amerscan
Employees: 30
Fun fact: The company name was derived when customers learned about the product and commented, "Wow, it's all in one box."

The ON-516 box will offer 155M bit/sec ATM links for WAN and LAN backbone connectivity and a Gigabit Ethernet link to support direct attachment of a file server or connection to a Gigabit backbone.

The ON-516 will compete with products such as Bay Networks, Inc.'s 350-T, which offers 24 Fast Ethernet ports but does not support IP-based virtual LANs, analysts said. Both OneBox switches deliver sophisticated VLAN support with configurable port- and IP-based VLANs.

As for network management, both devices have a built-in HTTP/Java-based Web browser. The products also can be managed from any SNMP-based console. OneBox is undergoing OEM agreement talks but has not signed any partners so far.

Pricing for the ON-100 ranges from $4,500 to $7,500. The box is available now. Pricing for the ON-516 starts at $4,950. The device will ship in November. ATM uplinks will ship by year-end and Gigabit Ethernet cards will be available in the first quarter of 1998.

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Avesta

Continued from page 1

ferret out the root causes of IT service problems and determine the impact these problems will have on IT resources and business operations. It is the quality of the information collected by Trinity that enables net managers to perform what Saifi calls "IT service management."

For example, Trinity's reasoning technology helps net administrators determine how a device fault or application performance problem will affect predefined service-level agreements related to network devices, PCs and servers, as well as applications. In addition, the software can identify what steps should be taken first to solve a problem, recommend moves to keep the problem from recurring and provide administrators with the documentation needed to solve the problem. The software also can provide business managers with information about application availability.

Too many existing products are simply "individual resource managers," said Saifi, who became frustrated with the lack of comprehensive IT management tools while on Wall Street. What is needed is a product that can manage complex corporate networks as well as emerging extranets, he said.

Avesta expects its software will complement products that manage individual network devices, systems or applications by correlating events collected by those packages. Trinity also will work alongside SNMP-based management products and broader offerings, such as Hewlett-Packard Co.'s HP OpenView and Computer Associates International, Inc.'s Unicenter TNG. Areas that Trinity does not focus on include software distribution, security and backup.

Trinity's makeup

At the heart of Trinity is a patent-pending, model-based reasoning technology that uses Java-based agents to discover all the elements that make up a network and the relationships among those elements. The information is used to create a model of the way faults and performance degradation permeate a network. The model can be split into management domains and can be updated as data changes about the network.

the buzz
HYPE OR REALITY?
Here's what to embrace and avoid when it comes to enterprise management tools.
Page 49.
the Buzz issue

Avesta will supply lightweight Java-based agents to build the model, as will third-party developers. In addition to building the model, the agents can be assigned to different tasks, such as monitoring error messages sent from applications to system logs and then generating events based on that information.

The model decides when information collected and processed by the agents should be dumped into a data store. Initially, Trinity will feature an Operational Data Store based on a Microsoft Corp. SQL Server database that serves as a cache. Down the road, Avesta plans to offer a data store to house information that can be used to generate reports based on long-term trends.

Information collected by Trinity is presented to network and business managers via console software called Service Manager and Service Viewer. Service Manager is for net administrators who need to view and control IT service delivery.

Service Viewer has a Java-based client interface that can present a plethora of information, such as reports and alerts, via predefined channels pushed to the end user. For example, the manager of a trading desk could stay updated on whether traders are receiving newsfeeds, stock quotes and other information as scheduled. Not surprisingly, Avesta has blended into its software some of the ease-of-use and real-time information delivery features found in trader terminals used on Wall Street.

Trinity runs on Solaris and Windows NT servers, while Service Manager and Service Viewer run on Solaris and Windows NT and 95 clients.

Trinity's Java underpinnings make it scalable and easy to use, according to beta customer Andrew Feig, vice president of product engineering for Internet service provider Voyager Networks, Inc. in New York.

PROFILE: AVESTA TECHNOLOGIES, INC.

Headquarters: New York
Founded: Oct. 1996
Management: Kam Saifi, chairman, president and CEO
Primary product: Trinity, Java-based software for managing service levels across distributed networks
Funding: $4 million in first-round funding from Trident Capital, Cognizant Enterprises and Terence Matthews, CEO of Newbridge Networks; the company is in the midst of raising $7.5 million in second-round funding.
Fun Fact: Trinity is named after a street in Avesta's neighborhood.

"This product discovers my network, automatically pings based on thresholds [and] does some correlation filtering pretty much out of the box," he said. "I don't need a C++ programmer or a Java programmer to get basic reports out of the system quickly and accurately."

Voyager is using Trinity to monitor "anything that's SNMP-manageable," Feig said, including routers, switches, servers and modems. Trinity "sits on top" of other software, such as Cisco System, Inc.'s CiscoWorks, that manages specific parts of the network.

Trinity currently is in beta. The client software will become generally available in the fourth quarter, followed by the release of the server software in the first quarter of 1998.

Avesta has not set pricing, but it will be on a per-server basis.

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New NCs bolster Java and multimedia apps performance

By John Cox
Mountain View, Calif.

Network Computing Devices, Inc. (NCD) and Accton Technology Corp. have unveiled network computers (NC) with an array of hardware features to supercharge graphical, multimedia Java and HTML applications.

The optimized NCs, driven by powerful CPUs, are intended to speed up Java applications, which are often seen as slow running, and to match or exceed the graphical capabilities of the current crop of Intel-based PCs running Windows.

In related news, speculation continues that one of the best known multimedia computer vendors, Apple Computer, Inc., is developing an NC of its own, to be unveiled at Macworld Expo in San Francisco in February. Reportedly, the Apple NC will use fast versions of the PowerPC chip and some type of Macintosh operating system, presumably with a Java Virtual Machine (JVM).

NCD's Explora 400 *(right), an entry-level device, can be used to run small Java applets, while the Explora 700 (left) is for running more complex Java programs.*

NCs are one type of thin client being touted as an alternative to Intel-based Windows PCs. The Java-oriented NCs run a midget operating system and are capable of downloading and running Java applications. A second type of thin client is the Windows terminal which accesses applications running on NT servers. In practice, both types also have software to access Unix and mainframe applications.

NCD's one-two punch

The new high-end Explora 700 NC from NCD, of Mountain View, Calif., offers very high-resolution and high-performance graphics, and includes MPEG decoding software to run videostreams. A JVM lets the device run Java applets locally. The main CPU is the powerful 64-bit MIPS R4700 RISC microprocessor. The 700 supports 10/100Base-T, 10Base 2 and wireless connections.

Network computers are one type of thin client being touted as an alternative to Intel-based Windows PCs.

NCD has added to the NC's operating software, called NCDware, the Independent Computing Architecture protocol from Citrix Systems, Inc., which lets the 700 access remote Windows applications. Unchanged is NCDware's connections to Unix servers and IBM mainframes, and built-in Web browser.

The 700 will be available in November with prices starting at $1,695.

NCD's Explora 400 models also can run Java applications but lack the 700's powerful processor. They are aimed at replacing dumb terminals.

The Model 400 has a 33-MHz PowerPC processor, and 10Base-T and wireless connections. The Model 450 has a 66-MHz processor, and 10/100Base-T, 10Base 2 and wireless connections. Prices start at less than $700, and both models are available now. All three NCs come with 8M bytes of RAM, expandable to 128M bytes in the 400 and to 256M bytes in the 700.

Accton action

Accton Technology, with a U.S. office in San Jose, Calif., is best known for network switches and interface cards. But last week at the Oracle OpenWorld user conference, the company unveiled its LanStation NC, which has a 133-MHz Intel Pentium CPU with MXX technology and various hardware enhancements to improve performance for multimedia HTML and Java applications.

The Accton device is based on the NC Reference Profile sponsored by Network Computer, Inc. (NCI), a subsidiary of Oracle Corp. The computer supports NCI's NC Desktop 2.1 operating system and NC Server 1.4 network software.

The LanStation includes an Intel Corp. 430TC core logic chip set for better peripherals throughput and comes standard with 32M bytes of SD-RAM and 256K bytes of SRAM cache memory. There is a 3-D sound chip and 16-bit stereo sound. The LanStation includes 2M bytes of virtual RAM for optimal video performance.

It will be available in October. Pricing will be less than $1,000. ■

Another NC contender enters the ring

Umax Data Systems, Inc., of Taipei, Taiwan, last week said it plans to build and sell network computers (NC) based on X86 microprocessors using client software licensed from Oracle Corp.'s Network Computer, Inc. (NCI) subsidiary.

Under a licensing deal unveiled at Oracle OpenWorld in Los Angeles, Umax will manufacture and market thin clients that use NC Desktop client software from Redwood Shores, Calif.-based NCI.

Umax is aiming to ship the devices in November and will market the product line initially in Europe before expanding into North America, officials said.

The first Umax NCs will use the 200-MHz Intel Pentium processor and will sell for less than $700.

The NCs will feature built-in Ethernet interfaces, graphics and sound cards, smart card readers, and a standard PC keyboard and mouse.

— Kathleen Ohlson, IDG News Service

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Microsoft developers snubbing Java

They cite lack of performance, reliability and maturity as reasons to stay away.

By Christine Burns
San Diego

It doesn't look as if Sun Microsystems, Inc. will pick up many Java converts from among the Microsoft faithful any time soon.

More than a dozen corporate and commercial programmers interviewed last week at Microsoft Corp.'s Professional Developer's Conference here said they are dabbling with Java to build simple, client-side applets. But they are not using Java widely to create business applications, nor are they keen on the Java execution environment in light of performance and reliability concerns.

"I don't think the whole aura around Java really poses a tangible threat to Microsoft," said one corporate developer who works for a large aerospace firm in the Northwest. "We are doing some minor Java development, but we will never stop building our Windows apps purely because of the growing volume of Microsoft desktops that we have."

Microsoft attempted to strengthen its hold on Windows supporters by using the conference to introduce Distributed interNet Applications architecture, a framework for building applications that blends client/server and Web technology (see story below).

FACTS ABOUT MICROSOFT DEVELOPERS

- 6,200 people attended the sold-out 1997 Microsoft Professional Developer's Conference
- More than 400 Windows developer organizations exist worldwide
- More than 300,000 people are Microsoft Developer Network online members
- More than 100,000 software applications run on Windows

Microsoft officials rarely brought up Java during the event. One exception was Paul Maritz, Microsoft group vice president of applications and platforms, who took 2 minutes out of his 90-minute keynote presentation to relegate Java to yet another development environment that allows users to quickly and simply build Web-based applications.

But many longtime Windows developers are hesitant to open their doors to Java, even in that limited capacity.

"I won't use Java in any of its forms," said Robert Johnston, a corporate developer with Edison Brothers Stores, Inc., a retail conglomerate in St. Louis. Edison Brothers is migrating all of its client/server inventory tracking and human resources applications to a corporate intranet based on Microsoft ActiveX Controls written in Visual Basic (VB). "Java is lightweight. So to get it to do the advanced things we need and can already do with VB, we would end up taking a lot of extra steps," Johnston said. "It's not worth it."

Java's simplicity is a draw and hindrance at the same time, said Greg Walker, a developer with Schlumberger Industries, Inc. of Austin, Texas. The company has attempted to use Java to write client-side programs that tap into its commercial oil exploration software.

"We could get [Java] to work inside a browser with a pretty short development time. But it's not mature enough yet to allow us to build in all the sophisticated charts and graphs we need to deliver," Walker said. "So it's really not useful to us yet because we need more than a scripting language."

Another strike against Java in the eyes of these developers is its failure to live up to its cross-platform promises.

FastLane Technologies, Inc. of Halifax, Nova Scotia, is using Java to develop a Web front end to its directory management software. However, developers at the company are having trouble getting the same Java applet to run inside Microsoft's Internet Explorer and Netscape Communications Corp.'s Navigator browsers.

"Under those conditions [where crashes can occur], there is no way you can expect to build a Java application with any semblance of fault tolerance," said Eric Kitchen, vice president of research and development at FastLane.

Kitchen said the company will likely turn to Dynamic HTML to provide Web ties once Microsoft integrates that technology into its Web browser and server.

Edison Brothers' Johnston also questioned the reliability of the various Java Virtual Machines, which permit Java applications to run across disparate operating systems. "All Java implementations are so open to interpretation by the companies that build them," he said. "If you put those out there on your network, you lose control and then you can't guarantee how stable your applications will be."

Developers also said Java applications run slower than Windows applications. One corporate developer with a large telecommunications firm said his company is testing an internally developed Java application that would help customers order enhanced telephone services.

"But that will never be put into production strictly because the performance is just too weak," the developer said.

An independent software developer, Traveling Software Corp., has no current plans to use Java to develop or implement its Windows-based remote connectivity software because of performance issues.

"Performance is everything when you are talking about tying users in over slow link," said Mark Goschie, an engineer with the vendor. ■

NT 5.0 beta blasts off

By Christine Burns
San Diego

Microsoft Corp. last week handed out the first beta copies of Windows NT 5.0, and officials made clear how much is riding on this code.

"This is a massive release," said Jim Allchin, senior vice president of the business and systems group, addressing the sell-out crowd at the Microsoft professional Developer's Conference here. "We are betting our business on it."

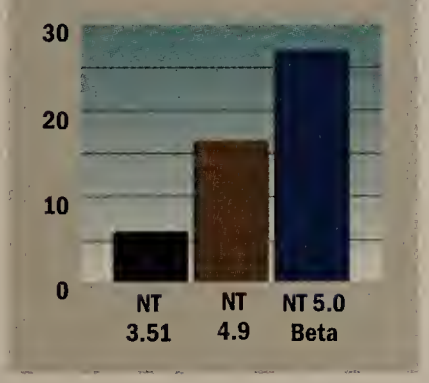
The long-awaited beta contains most of the distributed security, directory, advanced file and storage subsystem features the company had promised to deliver. But Allchin was clear that the code is not yet complete. Among the missing elements is IntelliMirror, which allows users to maintain the same desktop state regardless of their network connection. Also, the scalability of the NT 5.0 Active Directory service is not yet up to par, and the beta does not include as much hardware support as the company ultimately plans to offer.

Allchin also warned developers may have some problems getting the code up and running because of the restricted hardware support.

All 6,200 developers at the conference received an NT 5.0 beta CD. It soon will be available via the World Wide Web to all developers who subscribe to the Microsoft Developer Network.

Inside NT

The lines of code making up Windows NT have grown nearly five-fold from NT 3.51 to the 5.0 beta.



In other NT news, Microsoft and Cisco Systems, Inc. announced further developments in their efforts to employ Active Directory to manage physical network services. The companies have released a draft specification for extending the directory schema to support specific characteristics of hardware devices. More than 20 hardware and software vendors have signed on to review the specification that Cisco and Microsoft plan to submit to the Internet Engineering Task Force as a proposed standard. ■

Microsoft intros new way to write Windows apps

By Christine Burns
San Diego

Microsoft Corp. last week outlined a new way to write Windows applications that it claims will yield a new class of easily distributed and managed object-oriented software.

The new Windows Distributed interNet Applications (Windows DNA) architecture is supposed to simplify the building of distributed applications that have both client/server and Web ties.

When applications are written to the Windows DNA model, Microsoft officials contend the applications will be easier to deploy and control in large-scale networks. That is because underlying distributed NT 5.0 services automatically will manage the application components.

For example, Windows DNA components all will be written to register with the NT 5.0 Active Directory service. This means network administrators will not have to manually track where distributed objects reside on the network.

Windows DNA was unveiled last week at Microsoft's Professional Developer's Conference here. It is grounded in the distributed transaction, message queuing, directory and security services of Windows NT 5.0. These services are exposed in a unified way to all three tiers of the Windows DNA model: the user interface, application logic and data storage layers.

MICROSOFT APPLICATION DEVELOPMENT DEFINITIONS

- Windows Distributed interNet Applications – A framework for building integrated client/server and Internet applications.
- Component Object Model+ – Extensions to COM that make it easier to build and deploy distributed, object-oriented applications.

The glue that will tie these various application layers together is a new set of extensions to Microsoft's existing Distributed Component Object Model (DCOM) technology referred to as COM+. COM+ includes the ability to build component interceptors that automatically funnel COM objects to the appropriate NT service.

Microsoft surveyed the attendees at the conference regarding Windows DNA, and 70% said they planned to build applications using the new architecture, the company claimed.

A public specification for COM+ will be available for developer review before the end of the year. The first operating system support for COM+ will come when NT 5.0 ships sometime in the second half of next year. ■

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Briefs

■ **Compaq Computer Corp.** *last week rolled out a low-end* **Ethernet switch** *designed for power users and small workgroups. The Netelligent 5114 Desktop Ethernet switch has 12 10Base-T ports and two 10M/100M bit/sec Ethernet uplinks. The switch costs $966 and is available now.*

Netelligent 5114 switch

Compaq also unveiled a device that provides small businesses or branch offices with LAN connectivity and Internet access. The Microcom 808 offers eight shared-Ethernet ports, an IP router, two plain old telephone service interfaces and an ISDN Basic Rate Interface adapter — all in a single box. The device, available now, costs $899.

✆ Compaq: (800) 345-1518

■ **Novell, Inc.** *last week announced the availability of its* **advanced printing service,** *which enables network managers to use Novell Directory Services to centrally administer all aspects of distributed network printing. Novell Distributed Print Services (NDPS), which was codeveloped by* **Hewlett-Packard, Co.** *and* **Xerox Corp.,** *allows printers to be configured and managed from a console. It also provides bidirectional communication between end users and printers regarding the status of print jobs.*

NDPS comprises a back-end engine that runs on IntranetWare, a snap-in to NWAdmin, a series of gateways that allow existing printers to be discovered by NDPS, and Windows 3.1 and 95 client software. NDPS will be available next month and is priced at $49. Novell will integrate this advanced printing technology into its next version of IntranetWare.

✆ Novell: (801) 429-7000

Betting big on network computers

Neoware Chairman Arthur Spector looks for another winner with thin-client firm.

Q&A

A prominent high-tech investment firm is betting that corporate America is ready to fall in love with thin clients — computers that shift processing, storage and management to central servers and eliminate the need to run Windows locally.

Arthur Spector, *chairman of the Board, Neoware Systems*

Safeguard Scientifics, Inc., based in Wayne, Pa., is a $2 billion investment company with an enviable track record: It acquired and took public Novell, Inc. and, more recently, Cambridge Technology Partners, a leading systems integrator. The investment firm has similar hopes for thin-client vendor Neoware Systems, Inc. (formerly HDS Network Systems, Inc.), which last March merged with TL Ventures, a publicly traded Safeguard investment fund. The merged company promptly introduced a new line of thin clients and hired Sun Microsystems, Inc.'s Ed Callahan as CEO.

To get an investor's view of the thin-client market, *Network World* Senior Editor John Cox talked with Arthur Spector, formerly Safeguard's director of acquisitions and managing director of TL Ventures. Now he is Neoware's chairman of the board.

How did you get interested in HDS?

Some friends in the computer business introduced me to the company in early 1995. What [HDS Executive Vice President Michael Kantrowitz] showed me was that networks were going to grow even more than they had, but that the basic PC architecture was not the most efficient means of delivering information on the network.

So you heard a good sales pitch and just plunged in?

HDS was phasing out its old product line of X terminals and had begun to design the first network computer (NC). There was a design, concept and marketing plan. There were doubts and negativism [about the NC market] in 1995 and 1996. Now the questions are: What will the final architecture look like, and what level of penetration will the NC have?

Won't Microsoft Corp. have something to say about how well the NC does?

They've gone from pretending NCs don't exist to saying network computing is going to be a very major part of the landscape in terms of their support for Windows terminals [hooked to a multiuser version of Windows NT, code-named Hydra]. Our CEO, Ed Callahan, likes to joke that it's only a matter of time before Microsoft claims to have started the NC trend itself.

What did your contacts in the industry have to say about HDS when you were thinking about investing?

I received a lot of skepticism. It was very discouraging. But it all seemed just so wrong. When you looked people in the eyes and put the NC case to them, there just didn't seem to be a good reason against the NC, except an emotional reaction that people wouldn't want to use anything but a PC or people wanted control over their information.

So far Wall Street hasn't been too excited.

It's been erratic. The stock moves between $5 and $9 per share, which in terms of market capitalization is a huge move. The market doesn't know what to make of it.

I thought the NC market was going to move much faster than it has. It's taken a year longer than I thought it would.

Isn't that a bad sign?

The world really has changed. People today understand what the thin client is.

But aren't customers forced to choose between a thin client for Java and one for Windows?

We're not forcing customers to use Windows or Java. Our goal is to design a thin client that can run both. This is the machine we designed. ■

Get more online:

- Our audio primer on network computing
- A look at how PC vendors are building NetPC features into their systems
- Neoware white papers about network computers

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Prominet and FORE give their LAN switches a Layer 3 routing lift

By Jodi Daniels

Vendors are racing to incorporate Layer 3 routing capabilities into their LAN switches, and Prominet Corp. and FORE Systems, Inc. are no exception.

Both companies last week bolstered their respective product lines with integrated routing support.

First, Gigabit Ethernet startup Prominet enhanced its 45G bit/sec P550 Cajun Switch with wire-speed IP and IPX routing. The new-and-improved box will be on display at NetWorld+ Interop 97 in Atlanta next week.

To take advantage of the Layer 3 capabilities, customers must purchase a Multilayer Supervisor Module that adds up

See **Layer 3,** *page 28*

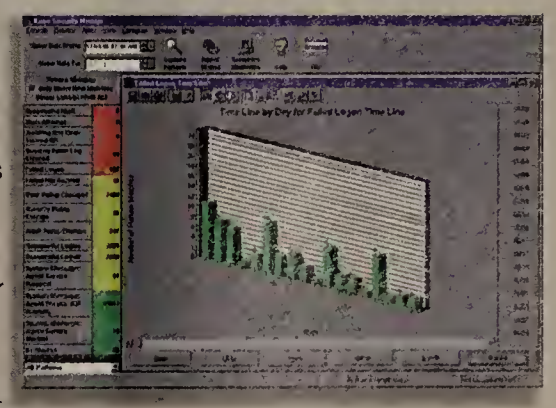
LAYERING ON LAYER 3

Prominet rolls out wire-speed multilayer IP/IPX switch modules for its P550 Cajun box.

- 2-port Gigabit Ethernet module
- 10-port Fast Ethernet fiber module
- 12-port autosensing copper Fast Ethernet

QUICK TAKE: KANE SECURITY MONITOR

Be alarmed over Windows NT break-ins



Intrusion Detection, Inc. has begun shipping a real-time burglar alarm system for distributed Windows NT 4.0 servers. The software tracks all security violations perpetrated by outside hackers and unauthorized internal users.

The Kane Security Monitor (KSM) includes artificial intelligence agents that sit on any NT machine and an administrative console that can reside on any NT machine. The agents scan NT System Event Logs for security break-ins such as unauthorized registry browsing, denial of service, failed logon attempts, password cracking and administrative ID abuse. When KSM detects a potential break-in, it alerts a security administrator via e-mail, fax, pager or audible alarm.

KSM is available now and starts at $995 for a console and agent software for a single server. Additional agents start at $795 per server.

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Intel snaps up Dayna

By Torsten Busse
Santa Clara, Calif.

Intel Corp. last week said it will acquire privately held network products maker Dayna Communications, Inc. in an attempt to capture a slice of the small business network market.

Intel plans to retain all of Dayna's 74 employees and maintain the company's operations in Salt Lake City, Intel officials said. Dayna will become a wholly owned subsidiary of Intel and part of Intel's Network Products Division, based in Hillsboro, Ore.

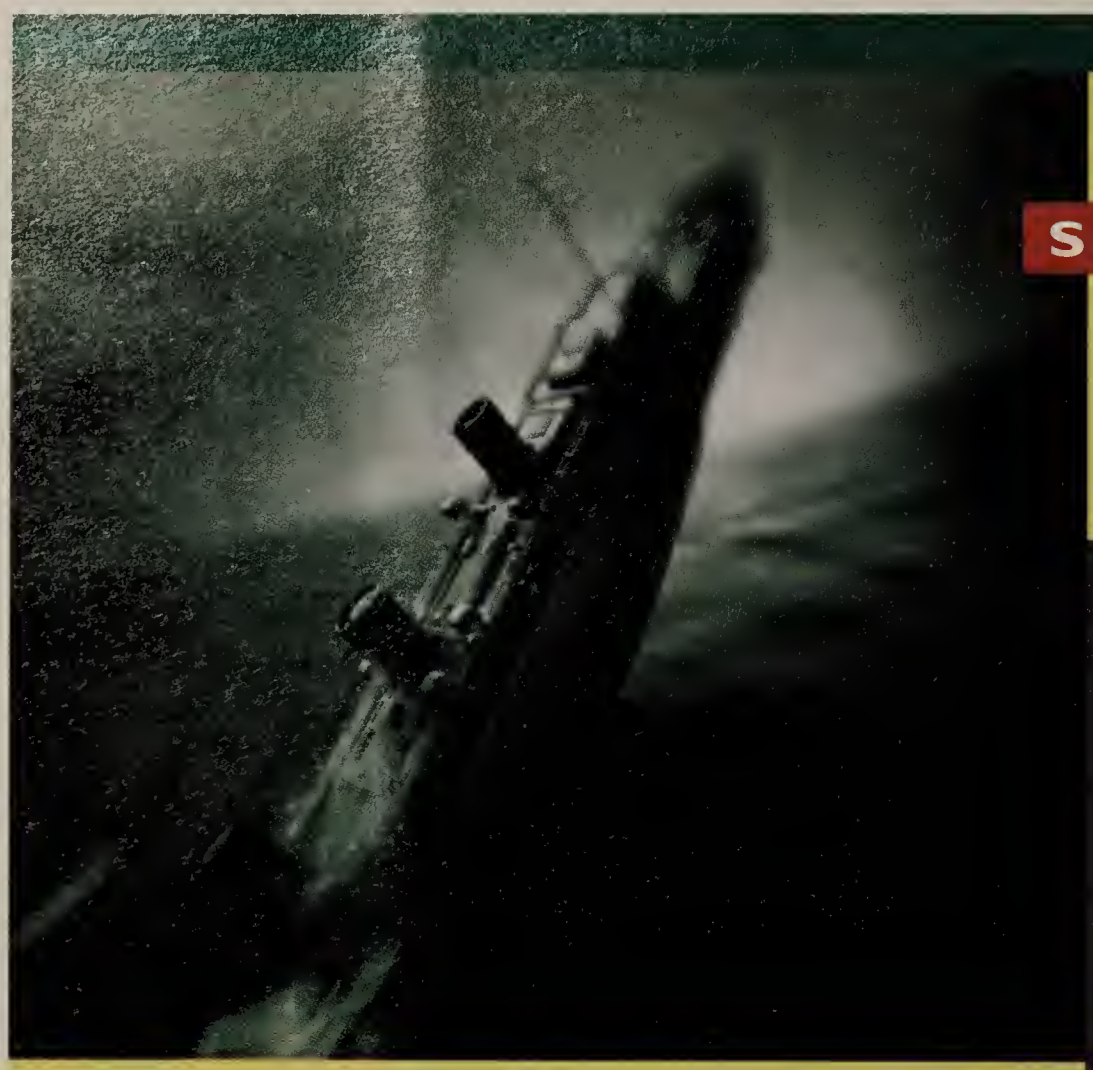
Financial terms of the transaction were not disclosed. The deal, pending shareholder approval, is expected to close by the end of November.

Dayna, founded 13 years ago, initially focused on building network products for small businesses using the Apple Computer, Inc. Macintosh platform. About a year and a half ago, Dayna started to offer products for PCs, said Brad Romney, Dayna's president and CEO. Romney declined to provide financial details of closely held Dayna.

Initially, Dayna's current product line will continue to be sold under the company's existing brand. Intel plans to introduce new products for small businesses in the first half of 1998 under the Intel brand.

Intel is especially interested in Dayna's NetCenter line of plug-and-play switches, hubs and routers designed for the Small Office/Home Office market, officials said.

Busse is a correspondent with the IDG News Service's San Francisco bureau.



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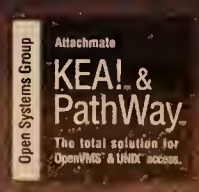
You wouldn't bet your business on a product or service floundering in a sea of change. That's why the timing couldn't be better to evaluate new PathWay™ for OpenVMS.™ It's from Attachmate, the same large, stable worldwide company that brings you KEA!™ Thanks to our acquisition of Wollongong we've been providing TCP/IP networking solutions to the OpenVMS market for over 15 years. When you add our focused dedication to developing PathWay to our renowned specialized support and reliability, it's all smooth sailing with PathWay for OpenVMS. Not in the next release. Not sometime in the future. But RIGHT NOW.



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Layer 3

Continued from page 25

NETWORLD+INTEROP 97

to 3 million packet/sec of routing. The supervisor module works with three new media modules to provide routing services. The cards include two-port Gigabit Ethernet, 10-port Fast Ethernet fiber and 12-port Fast Ethernet copper modules.

Customers can purchase the Multi-Layer Supervisor Module for Layer 3 capabilities or use the Cajun switch as a pure Layer 2 device with the original supervisor card. Pricing for a typical configuration of the P550 Cajun Switch with integrated routing will start at $20,000. The new technology will ship in the first quarter of 1998.

Separately, FORE last week rolled out two switches that support Multi-Protocol over ATM (MPOA), which combines Layer 3 switching with ATM switching.

The PowerHub 8000 Multilayer switch is a five-slot chassis — upgradeable to 15 slots — that boasts a backplane capacity of 3.2G bit/sec and operates at 1 million packet/sec. The box supports Ethernet, Fast Ethernet, FDDI and ATM connections.

FORE also unveiled the ForeRunner ASN-9000 box, which is a 1.6G bit/sec MPOA-based switch that supports as many as four 155M bit/sec ATM links.

In addition, FORE rolled out the latest version of its network management software — ForeThought 5.0 — which now supports MPOA, distributed LAN Emulation (LANE) and Private Network-to-Network Interface (PNNI).

PowerHub 8000 pricing starts at $15,950 and the device will ship in the fourth quarter. Pricing for the ASN-9000 will start at $14,950, and the box will ship in November. Software upgrades for PNNI and distributed LANE each cost between $995 and $2,995, depending on the ATM switch. Both are available now.

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riefs

ACT Networks, Inc.
ently introduced two inte-
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ices that support voice and

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N as well as mainframe data
ffic over **private frame**
lay networks. *The SDM-*
00 supports eight serial ports,
0M bit/sec Ethernet or token-
g LAN interface and data
npression. The SDM-9300 sup-
rts four serial ports and
cludes the other features, as
ll. SDM-9400 costs $9,795;
M-9300 costs $3,995.
© ACT: (805) 388-2474

Xyplex Networks, Inc.
ently introduced two fixed-
rt **remote access** *servers*
MAXserver 4 and MAXserver 8
with four and eight dial-up
rts, respectively.
The devices require external
dems and can be remotely
naged with ControlPoint,
plex's management applica-
n, which supports HP Open-
w, SunNet Manager and
mputer Associates Interna-
nal, Inc.'s Unicenter plat-
ms. MAXserver 4 costs $1,195,
d MAXserver 8 costs $1,795.
ey are available now.
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How management vendors spell relief

By Jim Duffy

If your management migraine is rooted in reporting, integration or intranet administration, some new remedies may help.

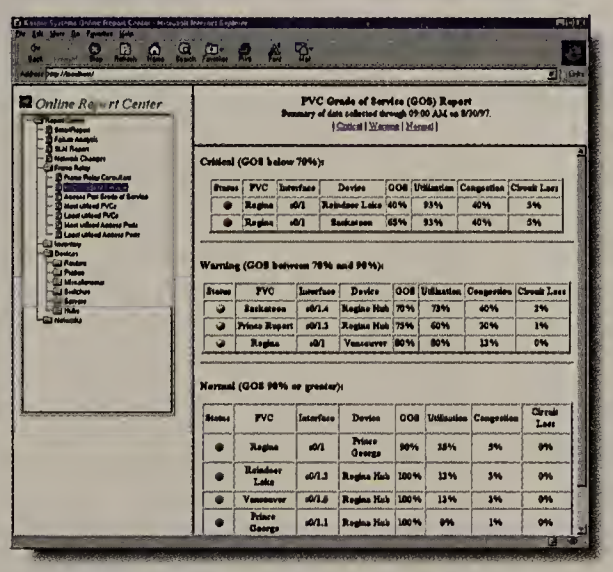
In fact, last week, four vendors rolled out products and programs designed to mitigate your management malaise.

Hewlett-Packard Co. and Kaspia Systems, Inc. have enhanced their respective network performance reporting tools. At the same time, BMC Software, Inc. rolled out a program to patrol third-party integration, and Objectivity, Inc.'s Aziza division unveiled an enterprise Web content manager.

HP unwrapped NetMetrix 5.0, which now can provide Web-based reports on Remote Monitoring (RMON) 2-compliant Ethernet, Fast Ethernet and FDDI probes and Cisco Systems, Inc. Catalyst 5000 switches. It also offers LAN and WAN traffic statistics. Catalyst 5000-specific reports include information about alarms, trap destinations and RMON diagnostics. For LAN/WAN diagnosis, NetMetrix 5.0 can pull protocol and top talker information off WAN links to provide an "end-to-end" traffic report. NetMetrix 5.0 starts at $5,995 and is available now.

Kaspia has enhanced frame relay WAN visibility with its Frame Relay Audit System. The product monitors frame relay performance over time, correlating data to provide historical trend analysis and delivering via the World Wide Web.

The Frame Relay Audit System monitors point-to-point connections between two Data Link Circuit Identifiers. It provides reports on utilization, congestion, circuit loss and mean time between failures against the committed information rate guaranteed by a service provider.



New Kaspia software *tracks frame relay point to point.*

The Frame Relay Audit System is part of Kaspia's automated network monitoring systems, which starts at $5,000.

If WAN reporting and analysis doesn't ail you, but product integration does, BMC has begun the membership-based Patrol Developer Network. PDN provides software development tool kits, product certification and branding for developers adding BMC's Patrol application management technology to their products. One PDN tool kit is designed to instrument intelligent I/O subsystems with Patrol-enabled manageability. PDN membership begins in November and costs $995.

For those grappling with intranet content management, Aziza unwrapped Enterprise Web Manager.

The software helps users administer large-scale, multiserver intranet Web sites by distributing or replicating content across multiple Web servers via drag-and-drop object manipulation.

Aziza's Web Object Manager, which runs on Unix and Windows NT servers, coordinates concurrent access to Web pages and manages page metadata, such as authors, versions and expiration dates.

Web Management Clients provide graphical management of Web sites, and Web Content Servers deliver content to and from browsers and editors.

Enterprise Web Manager is available now and is priced from $8,000 to $30,000.

✆ HP: (800) 752-0900; Kaspia: (503) 644-1800; BMC: (800) 841-2031; Aziza: (800) 767-6259

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Are dedicated remote access boxes doomed?

By Tim Greene

The days of buying separate dial-up access server boxes may be numbered as more hardware vendors exploit the remote access capabilities built into Microsoft Corp.'s Windows NT.

This week, Access Beyond, Inc. and NetAccess, Inc. will announce cards for network servers that add dial-up interfaces for remote users. This follows Ariel Corp.'s announcement last week of its similarly configured RASCAL product line (*NW*, Sept. 22, page 14).

Using the remote access capabilities of Windows NT RAS, products from all three companies provide dial access to corporate LANs by dropping phone ports into vacant slots in PC server gear, which customers likely already have.

"It's a lot cleaner than a Digiboard with a modem bank. It's just a board you plug into your computer," said Jon Allan, network administrator at Interactive Group, of San Diego, which uses Ariel RASCAL RS1000 boards. Plus, board-level hardware is less expensive than separate remote access devices, Allan said.

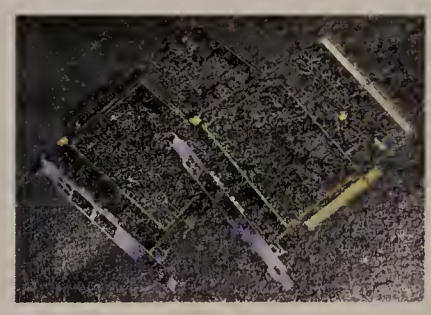
The move toward boards that turn PC servers into remote access servers is spurred by NT RAS, according to Kitty Weldon, a consultant at The Yankee Group in Boston. And with that remote access capability on hand with NT, corporate IT staff does not have to learn a new system, she said.

The trend may be accelerated by the ever-increasing performance of modem chips. For example, Analog Devices, Inc. this week will introduce a single-chip modem, the ADSP-21mod870, that includes the modem controller.

The company claims it will support as many as 96 modems on a single board. By the year 2000, Analog Devices will have a single chip that supports three modems and controllers, officials said.

While they follow the same pattern, each product differs.

Access Beyond will announce Hawk 2290, which supports dial-up for NT or Novell, Inc. NetWare servers. Hawk consists of four ISA cards: a two-port termination card for T-1 or Primary Rate Interface (PRI) ISDN lines and three 33.6K bit/sec modem cards that each support eight dial-up ports.



NetAccess *remote access cards can substitute for remote access servers.*

Available now, the list price of a complete Hawk set is $10,995. NetAccess' Instant RAS PCI-PRI can support either 23 or 46 64K bit/sec ISDN calls.

It consists of a one- or two-port PRI card and 24 or 48 64K bit/sec ports. The price for 48 ports is $3,999.

NetAccess will add support for analog calls later this year.

✆ Access Beyond: (800) 456-7844; NetAccess: (603) 890-7203

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IBM makes a grab for Fast Token Ring

IBM abandons 128M bit/sec token-ring plan, announces 100M Fast Token Ring adapter card.

By Marc Songini

Big Blue last week took a small step for a corporation, but possibly a giant step for the token-ring industry.

IBM announced the upcoming release of a 100M bit/sec Fast Token Ring adapter card, the first product in a series that also will include enhanced switches and routers. Token ring currently runs at either 4M or 16M bit/ sec, which has left many contemplating a move to Ethernet.

IBM is one of a group of high-profile token-ring vendors that committed to a 100M bit/sec standard in August. The group, informally dubbed the High-Speed Token Ring Alliance, agreed at a forum in Boston, sponsored by *Network World* and The Tolly Group, to begin work on products that scale from 100M bit/sec to 1G bit/sec.

Heavy hitters

Some of the most recognizable vendors in the newly formed High-Speed Token Ring Alliance:

- IBM
- 3Com
- Cisco
- Madge Networks
- Texas Instruments
- Cabletron
- Bay Networks

The alliance last month made a formal announcement of its commitment to Fast Token Ring. The alliance said it will present a draft of its specifications to the IEEE 802.5 committee in November.

IBM said its new adapter will reside in token-ring clients or servers. The card attaches to PCI buses and will run at 4M, 16M and 100M bit/sec.

The company is still working out a strategy for adding Fast Token Ring routers and switches.

128M out, 100M in

Dave Olechovsky, product manager for the High-Speed Token Ring adapters unit at IBM and chairman of the alliance, acknowledged that IBM had been toying with the idea of having 128M bit/sec Fast Token Ring but opted to abide by the alliance's decision for 100M bit/sec products.

"It's not a real loss," he said. "We talked with customers and other members of the alliance, and it turns out they're indifferent whether or not we go with [100M or 128M]." IBM predicted the cards will be available by September of next year.

IBM's move to support Fast Token Ring "gives the token-ring customer a choice," Olechovsky said. "We've heard loud and clear they wanted to be able to fix bottlenecks in the network. This fixes the bottlenecks."

Users will be happy to hear that something is being done to give them a reason to stick with token ring. "We've already had tremendous success with token ring in the 4M and 16M bit/sec products," said David Paul McGhee, manager of network support for Little Rock, Ark.-based Dillard's Department Store. McGhee's network has approximately 10,000 token-ring users, and he is glad to know that there is the option of migrating to faster technology.

"IBM is protecting our investment," he said. The company can avoid having to buy a different technology and retrain its employees, McGhee said. Retraining is the most expensive part of moving to Ethernet or other networks. ■

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Briefs

■ **President Clinton** *this week nominated Gloria Tristani, a member of the New Mexico State Corporation Commission, to the Federal Communications Commission. State regulators pushed for the nomination of one of their own to try to smooth out disputes between states and the FCC over implementing new* **telecom rules.** *Tristani completes a group of four new commissioners slated for Senate confirmation hearings next week. Current member Susan Ness will remain on the five-member commission. The FCC's 2,000-person staff also is suffering rapid turnover as broad-based telecom reform stumbles.*

■ **Northern Telecom, Inc. and ArelNet, Ltd.** *last week signed a memorandum of understanding in which Nortel will exclusively distribute ArelNet's I-FAX real-time fax and* **voice-over-IP** *software in North America. Nortel also is investing $5 million in the company with the option to acquire a controlling interest in the next three years.*

■ **MCI Communications Corp.** *is deploying the Siemens/Newbridge MainStreetXpress 36170 Multiservices Switch throughout the* **backbone of its ATM network.** *The MainStreetXpress 36170 switch offers interfaces ranging from sub T-1 speeds to OC-12 (and adding OC-48 in the future.) The switch also supports inverse multiplexing over ATM and switched virtual circuits. MCI will use MainStreetXpress 46020 Network Manager, 45020 Element Manager and Connect Exec.*

■ **Amati Communications Corp.** *and* **Alcatel Data Networks** *last week announced they will share asymmetric DSL (ADSL) technology and perform interoperability testing to speed ADSL services by carriers. Alcatel has contracts with four regional bell operating companies to provide them with ADSL gear.*

US WEST scales back on DSL development

Carrier initially opts for a slower rollout in fewer locations than originally promised.

By Tim Greene
Denver

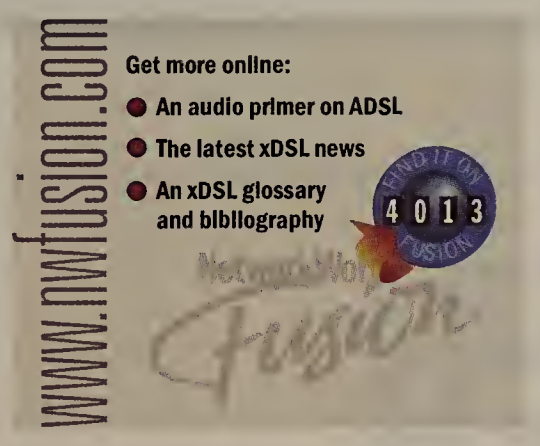
In January, US WEST, Inc. was gung ho about digital subscriber line (DSL), spelling out a bold 14-city deployment plan across 10 states that was supposed to be completed by now.

But with no formal announcement of any change, the company has put the brakes on the plan, instead easing service in Arizona and Utah sometime in the next 60 days.

The new caution may be the cold slap of reality hitting the DSL industry as carriers try to translate the promising technology into services that can be supported in high volumes.

For example, SBC Communications, Inc. in California plans to start asymmetric DSL market trials this week after months of beta testing with a small sample of users around San Francisco. Other carriers are making similar, methodical approaches to case-harden DSL technology before turning up services.

Kieran Taylor, broadband analyst for TeleChoice, Inc., a consultancy in Verona, N.J., said DSL services require a lot more thought and planning than originally expected. And the technology may not be as carrier-class as some were at first led to believe.



"There's too many forms of DSL, too many equipment manufacturers. It's difficult to make a decision," Taylor said.

US WEST now plans to start marketing MegaBit DSL service in parts of Arizona and Utah within 60 days, according to Greg Gum, executive director of MegaBit Services.

The service, supported by high-bit-rate DSL, will be divided into two pieces: MegaSubscriber and MegaCentral. MegaSubscriber which connects the remote user to the carrier network and MegaCentral, aggregates the remote-user traffic onto a broadband feed to a corporate network or Internet service provider.

By combining MegaSubscriber and MegaCentral services, corporate customers can tie in remote offices or telecommuters to the corporate LAN. Speed options from the remote user location are 192K bit/sec, 320K bit/sec or 704K bit/sec.

A MegaSubscriber connection would be established over a regular phone line, and customers would simultaneously be able to use the line for dial-up voice calls.

Feeds to the corporate end would be Ethernet links at 704K bit/sec, 1.536M bit/sec, 3M bit/sec, 6M bit/sec or 9M bit/sec, and they will be run over a T-1 or T-3 line.

US WEST would not discuss prices for MegaSubscriber, but according to a federal tariff filing, the minimum monthly cost for MegaCentral is $441 (see graphic). MegaCentral speeds range from 1.55M bit/sec to 45M bit/sec.

ISDL shelved

With its current agenda, US WEST dumps earlier plans to use ISDN-based DSL (IDSL) technology developed by Ascend Communications, Inc. The service would have run at 128K bit/sec, and the customer would have needed a standard ISDN terminal adapter to support it.

Taylor said cancelling the IDSL plan made sense because IDSL tops out at 128K bit/sec. It also would require upgrading the central office gear to another technology, such as asymmetric DSL, as users sought more speed. ■

PAYING TO AGGREGATE THE TRAFFIC

In addition to DSL line charges, organizations making DSL available to remote users must pay a port charge to aggregate the traffic.

Port speed	Regular monthly rate	Monthly rate under 1-year contract	Monthly rate under 3-year contract
1.544M bit/sec	$910	$455	$441
3M bit/sec	$1,934	$967	$938
Each additional 3M bit/sec up to 45M bit/sec*	$478	$239	$232

* Add to rate for 3M bit/sec

Flat setup fee of $500 per port applies. US WEST may announce discounted rates for volume deals at a later date.

SOURCE: US WEST, DENVER

PadCom bridges wireless gap, touts flexibility and savings

Device ties different wireless systems together.

By Denise Pappalardo
Bethlehem, Pa.

Wireless technology and services are a bit like a dysfunctional family — lots of interesting characters that often have trouble speaking to each other.

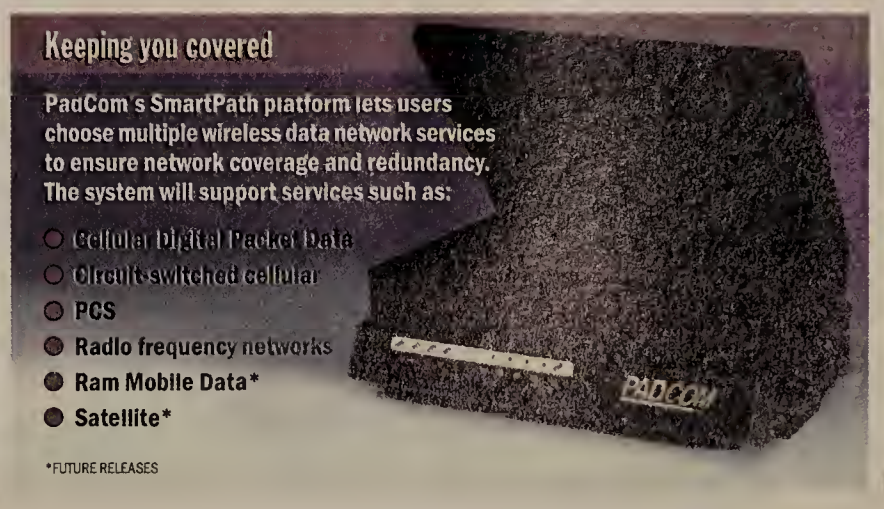
PadCom, Inc. hopes to bring a few of the parties closer together with last week's introduction of SmartPath, a device that allows end users to communicate over a variety of wireless data networks.

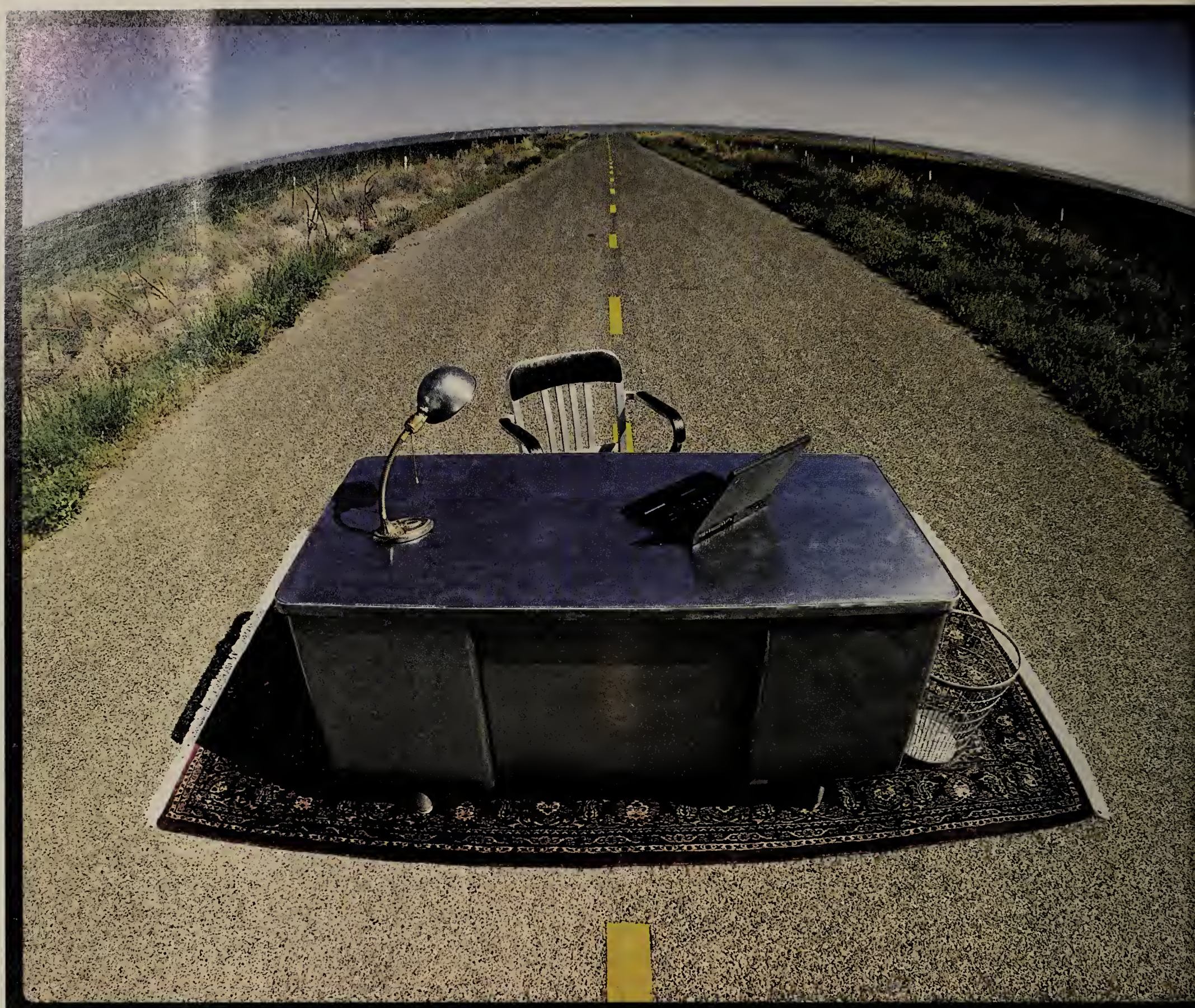
Besides providing compatibility, SmartPath also will let users define where their wireless data should be sent, based on cost, message size and time of day. If the user is out of primary system range, the system sends their data to a secondary system.

SmartPath consists of a router device that works in conjunction with the user's laptop, and a Santa Cruz Operation, Inc. Unix-based server that would be set up at a user's headquarters. Orange & Rockland Utilities, Inc. started testing PadCom's SmartPath platform last week, said Frank Peverly, assistant manager of operations at the Pearl River, N.Y.-based gas and electric utility company.

The company uses its own radio frequency (RF) wireless

See **PadCom,** *page 36*





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IP vendors raise voice stakes

Voice On the Net conference sets stage for new quality-driven releases.

By Denise Pappalardo
Boston

Thousands of ears tuned into the Voice On the Net conference here last week, where vendors promised to improve the quality and interoperability of IP telephony products and services.

One highlight was a pledge by 25 vendors to conduct interoperability testing.

The show also saw the launch of a new service company. Networks Telephony Corp. (NTC), an Infonet Services Corp. spinoff, will work with Internet service providers to let users make voice calls from their PCs to any telephone around the world.

While NTC will be using NetSpeak Corp.'s WebPhone, the service primarily will run over a data network — not the public Internet.

Voice On the Net

NTC will use Infonet's Integrated Media Services data network, which is based on Northern Telecom, Inc.'s Magellan Passport ATM switches (*NW,* Sept. 15, page 66).

NTCVoice, the first service that will be available from the start-up, will let users click on an icon on their desktops to initiate a call, said Mike Radice, vice president of marketing at NTC and vice president of corporate marketing at Infonet, one of NTC's principal investors.

Once users are connected to their ISPs, the voice call will connect to an NTC Internet (I)-Bridge. The I-Bridge is an ACTNetworks, Inc. and NetSpeak hybrid interface that encapsulates voice traffic in cells to be transmit-ted over Infonet's data network.

"The good thing for users is that Infonet has a very good international data network, which could offer considerable savings," Wetzel said.

The voice call then travels as far as possible on Infonet's network, which reaches 37 countries. The call then hits an NTC Phone (P)-Bridge, where it is translated back to analog so it can travel over a traditional telephone network.

ISPs that team with NTC could be one-stop shops for businesses seeking voice and 'Net access, even if that ISP serves only a small region, said Rebecca Wetzel, director of Internet services at TeleChoice, Inc., a Verona, N.J.-based consulting firm.

"The good thing for users is that Infonet has a very good international data network, which could offer considerable savings," she said.

Because the voice call is only on the Internet for a short time, the quality is better than a call that spends the majority of its time on the 'Net, NTC's Radice claimed. And NTC service charges are 30% to 50% lower than AT&T, MCI Communications Corp. or Sprint Corp., he argued.

More than 100 domestic and international ISPs are waiting to offer NTC's service, and several are in beta now, Radice said. NTC also will announce a fax service and an Internet roaming service next month.

A wider gateway

The conference also had a heavy focus on hardware. As expected, NetSpeak announced its WebPhone Gateway eXchange Enhanced Platform (WGX-EP) (*NW,* Sept. 15, page 27).

The latest addition to the WGX family was developed in conjunction with Natural MicroSystems Corp. and its Fusion IP telephony software.

WGX-EP, which is based on the Fusion software, can scale up to four T-1 trunks that equal 96 ports.

Previous versions supported one T-1. The product is available now and priced between $36,000 and $230,000, depending on the number of ports and the gateway's software configuration. ■

PadCom

Continued from page 33

network today and is in the process of switching from an all-voice to an all-packet dispatch system.

Orange & Rockland owns its wireless network, but it wants the flexibility to add Cellular Digital Packet Data (CDPD) or Ram Mobile Data services when needed, Peverly said.

Once all 150 mobile workers start using the packet system, the RF network will be hit with a lot more traffic. "If some of the mobile workers can use a different network then a portion of our primary network will be available for emergency voice calls," he said.

Choose your weapon

SmartPath, at least according to one analyst, allows users to choose the best service for certain types of data. They can use circuit-switched wireless services for longer data transmissions, such as faxes, and CDPD services for shorter, bursty traffic using the same device, according to Roberta Wiggins, director of wireless mobile communications at The Yankee Group, a Boston-based consulting firm.

The SmartPath software uses a series of algorithms to define the parameters that decide how data will be transmitted. The parameters are primarily set up before the products are shipped out to their customers.

Changes cannot easily be made by the user once they have the SmartPath system installed, but future releases will be more intuitive, said David Whitmore, president of PadCom.

For example, if a user decided he wanted to change the packet threshold of his primary service, he would have to contact PadCom to tweak the software.

The SmartPath platform is available for approximately $2,000 per user, which includes the routers with two interfaces and the server that supports 150 users. Services add an extra $500 to $1,500 per user.

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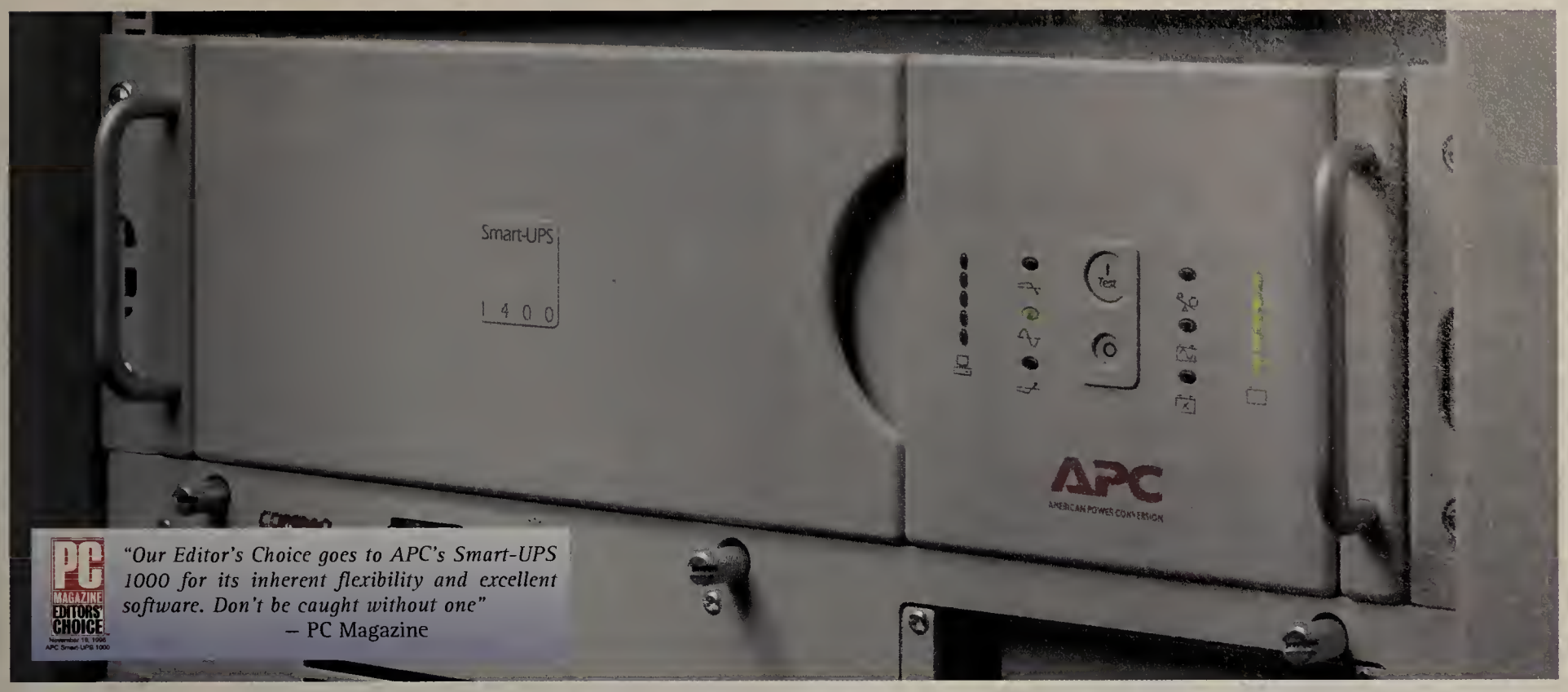

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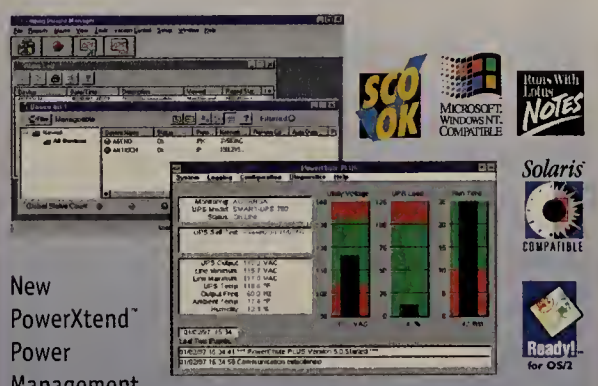

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Briefs

■ **Borland International, Inc.** *is bolstering software development offerings for* **AS/400** *users with the shipment of a C++ tool and the announcement that it will work with* **IBM** *on Java tools for the midrange platform.*

At the Fall '97 Common IBM AS/400 user group conference in San Antonio, Texas, Borland announced the immediate availability of C++ Builder/400 Client/Server Suite, which is priced starting at $3,995.

AS/400 *to get Java boost.*

Meanwhile, Borland agreed to work with IBM's AS/400 division on tools for developing Java applications and applets. The tools will be based on Borland's JBuilder Java development software. The two companies still need to negotiate and sign a definitive agreement, according to Borland.

✆ Borland: (408) 431-1000

■ **WebManage Technologies, Inc.,** *of Nashua, N.H., last week announced NetIntellect 3.0, a new release of its* **Web server log analysis product.** *The software, a 32-bit Windows 95 or NT application, now is able to process log files at speeds of more than 15M bytes per minute. It also includes a new user interface and can generate intranet reports that can be e-mailed to appropriate parties. The software costs $199.*

✆ WebManage: (603) 594-9226

■ **IBM** *has begun shipping KeyWorks, a tool kit that lets developers add* **cryptographic and digital certificate services** *to their applications, whether they are running on AIX, Windows 95 or NT. The KeyWorks API also offers the option of adding generic key-recovery support to applications.*

✆ IBM: (914) 766-1900

Microsoft delivers a solid browser, but fails to land knockout punch

By Lee Schlesinger

Is Microsoft Corp.'s Internet Explorer 4 a better browser than Netscape Communications Corp.'s Navigator 4? No, it is about as good. But since it's free and integrates with Windows 95, does it leave any compelling reason to pay for Navigator? Probably not. Nor does it provide those who already use Navigator with a compelling reason to switch.

The most notable new feature of Internet Explorer 4, due to ship later this month, is Active Desktop, which gives your Windows 95 icons a hypertext look and hyperlink behavior. They are underlined and can be activated with a single, instead of a double, click.

Active Desktop is interesting, but it's flawed in the Preview 2 release we tested. One of its most promising features is the ability to make a Web page your desktop background. But in this release, it's too slow. With the feature enabled, it takes far longer to refresh the screen and maneuver the cursor around the desktop.

The browser also does not behave as expected when you click on links on the desktop background. Rather than changing the desktop display to the page associated with the link, Internet Explorer 4 invokes a new browser window in which it displays the linked page. The first page remains in the background, leading us to ask, what's the point? We expect fuller integration and better performance by the time Windows 98 rolls out.

Like Navigator, Internet Explorer 4 lets you browse offline if you've previously downloaded the sites you want to visit. But it goes a step further than Navigator by letting you subscribe to a site. Internet Explorer 4 periodically will check subscribed sites and let you know whether content has changed.

You also can ship the page or URL you are currently browsing to someone else, using the e-mail program of your choice. Navigator has a similar function.

You can customize settings in Internet Explorer 4 by using the toolbar or a menu item, but changing preferences isn't as simple as with Navigator. And Internet Explorer 4 gives you only five choices for font size; Navigator lets you specify your fonts' point sizes exactly.

But Internet Explorer 4's toolbars are highly customizable, as is the display. Four new buttons on the main toolbar let you bring up a pane along the left side of the display for one of four purposes: search, favorites, history and channels.

Displaying your list of favorite sites or a history of sites you've recently visited is a good browsing aid, at the cost of a bit of screen real estate. The search view is the strongest of the new features. It brings up a pane displaying your choice of one of seven Internet search engines. Search results are displayed in the left pane, while the page associated with any link you click appears at the right (see graphic). You can quickly traverse multiple links this way.

In Internet Explorer 4, *a new search pane (left) stays in place while you click on each search result to view found pages in the right pane.*

As for channels, they are the latest integration of push technology with a browser, analogous to Netscape's Netcaster. You can download changed content automatically, be notified of the change or set a channel to act like a screen saver, in the manner of PointCast. Unfortunately, every time we tried to use the Channel Subscription Wizard to test this feature, our beta copy of Internet Explorer 4 crashed.

One other thing rubbed us the wrong way. If you choose to be notified when a Web server wants to send you a cookie, Internet Explorer's message alerting you to the fact doesn't mention the word "cookie" (perhaps to avoid jargon) and doesn't give you information on the contents of the cookie unless you click on the More Info button.

See **Explorer,** *page 41*

Qualcomm steps up its e-mail server efforts

WorldMail Server 2.0 features better administration and configuration capabilities.

By Paul McNamara
San Diego

Qualcomm, Inc., best known for its popular Eudora Pro e-mail client, will soon expand its recently staked position in the standards-based *server* marketplace, by introducing WorldMail Server 2.0.

Currently in beta, the upgrade will add ease-of-installation and configuration features to WorldMail Server 1.0, the company's first Internet e-mail server released in April.

Built to run on Windows NT, WorldMail Server 2.0 includes enhanced support for the Lightweight Directory Access Protocol; capabilities to delegate simple administration tasks to a department or domain; and support for the Application Configuration Access Protocol (ACAP), which allows user configuration data to be stored on a server accessible from multiple clients.

"[ACAP support] makes sense if people are moving from client to client," said Mark Levitt of International Data Group, a market research firm in Framingham, Mass. "Instead of having to constantly configure the new client for your profile, it's nice to be able to have the server do that."

Qualcomm has a lot riding on the WorldMail Server effort, Levitt added.

"The client software market is going to become very difficult as Microsoft and Netscape effectively give away their clients," he said. "In order for [Qualcomm] to grow up into a company that supplies the enterprise, they need to have a full solution, not just their client plus other shareware servers or someone else's servers."

Scheduled for shipment by Oct. 31, WorldMail Server 2.0 will be a one-time-only free upgrade for existing WorldMail customers and will cost others $179 for a 10-user server license. Volume discounts are available.

In addition to WorldMail Server 2.0, Qualcomm is making available on its Web site this week the commercial release of Eudora Internet Mail Server (EIMS) 2.0 for the Macintosh operating system. The company hopes this product will give Macintosh shops an eventual migration path to WorldMail Server.

EIMS 2.0, which supports multiple domains and includes antispam features, costs $199 per server and comes bundled with the Eudora Pro client and a five-user license for $299.

✆ Qualcomm: (619) 587-1121

Electronic commerce Sun-style

As director of Internet and electronic commerce marketing at Sun Microsystems, Inc., Dennis Tsu's job is to advise the company on what customers are demanding so it can develop new products for electronic commerce. Tsu also spends time with U.S. and foreign government officials to get Sun's policy viewpoints across. In an interview with *Network World* Senior Editor Ellen Messmer, Tsu described how Sun sees — and conducts — electronic commerce.

What are your chief responsibilities?

It is just in the last two or three months that we have called out the words 'electronic commerce' formally in my title. A big part of my job is to define what electronic commerce is and will mean. Electronic commerce from most people's perspective is buying a pair of shoes, a pair of pants, a book, a CD or something [over the Internet]. Electronic commerce is going to be a several billion-dollar business [for Sun].

Sun's Tsu *says electronic commerce could be a $1 billion business for Sun this year.*

By when?

It will probably be at least a billion-dollar business this year. But in our perspective, the business-to-business aspect of electronic commerce is going to be 10 times larger, if not more, than the [business-to-consumer market]. For Sun, electronic commerce is buying keyboards and monitors from our suppliers and, in turn, taking orders from our distributors through the Internet. On the street, some financial analysts are saying that by the year 2000, we may well be a $20 billion company through electronic commerce transactions.

Is Sun active in electronic commerce today?

Yes. It is called Sun Plaza, and it can be reached if you go to www.sun.com. You can order Sun equipment there today. And do we do it with some of our customers? Absolutely. For example, NASA and certain parts of the U.S. government have had a long-standing requirement that they place orders with us in that fashion. So we do that.

One of the most recent, larger contracts that we won with the federal government was for U.S. Department of Defense workstations. One of the contract's obligations was that within a defined time period, we had to make available to any authorized buyer within the Defense Department the ability to order [over the Internet] any one of the thousand parts at a specified government price. And that is not electronic data interchange!

Did they define the formats?

No. The requirements were pretty loose because the Defense Department, as much as the vendor community, is still experimenting with what is really possible in this arena. As this implementation unfolds, there will be a lot of back and forth between Sun, the industry, the [Defense Department] and other parts of the government to explore how we ought to set standards.

What areas does the U.S. government need to address to ensure that electronic commerce works?

Taxation is clearly one. You are aware of what President Clinton advocated for the framework of electronic commerce, but that is just the administration's advocated position, not legislation. [It] may be converted into legislation with the Cox/Wyden bill. But there are several states that are not necessarily in favor of adopting the administration's position. ■

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Marimba plots future direction

By Joanne Taaffe
Palo Alto, Calif.

Marimba, Inc. is expanding the focus of its Internet push technology to the broader class of Internet devices. It plans to ease application management using its Castanet technology, according to CEO and President Kim Polese.

Polese also emphasized how important standard class libraries are to preventing the fragmentation of Java.

Within the next year Marimba plans to release a version of its Castanet software that will hand more control to IT managers. Using the technology, administrators will be able to decide who receives which updates to an application and when. This means administrators will be able to let employees see their company's entire inventory control, while restricting a supplier's view to the parts they provide.

Marimba's plans for Castanet also include increasing the company's focus on Internet devices — from mobile phones to printers. "An explosion is about to happen with all IP devices," Polese said.

She said Marimba's Castanet client technology occupies very little memory — its software client requires less than 1K byte — which means that it can fit into a printer. And into a printer it looks set to go — Marimba is talking to a number of companies, including Hewlett-Packard Co., about possibly building the Castanet transmitter into a departmental printer.

But the shrinking of software code — particularly Java applets — to fit inside a range of IP devices will call for a more disciplined approach to how companies develop Java software.

"Vendors need to ensure that the Java Virtual Machine is a very specific set of class libraries that can run on all these different platforms, so that we can achieve the dream of Java that is still possible," Polese said.

At the moment, there is a war of egos raging between vendors, each seeking to write the definitive set of class libraries, according to Polese.

"The Java community needs to be very focused on having one core, simple set of class libraries; there's been a tendency to stuff too much functionality into a core set of class libraries and each vendor wants to mushroom that set of core classes and ... you run into compatibility issues," she said. For more information contact Marimba at (415) 328-5282.

Taaffe is an IDG News Service correspondent in Paris.

Explorer

Continued from page 39

In contrast to the integrated approach that Netscape took — and later abandoned — with Navigator, Microsoft ships just the Internet Explorer 4 browser but lets you download several complementary applications. They include:

- Outlook Express, a tool for reading e-mail and Usenet messages
- NetMeeting, a T.120 video and document conferencing application
- FrontPad, a stripped-down version of Microsoft's FrontPage Web page composition tool
- NetShow, a player for streaming audio and video
- Web Publishing Wizard, a tool for posting your Web page

As a browser, Internet Explorer 4 is a capable tool. The choice of Internet Explorer 4 vs. Navigator comes down to individual preference. In terms of usability, we prefer Navigator. Still, if you want to roll out Internet Explorer 4 companywide, it's unlikely anyone will resign in a huff. And the addition of all the free, optional components makes Internet Explorer 4 hard to beat for value. ■

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The Buzz Issue

The truth behind the industry buzz

PHOTO: RODNEY OMAN BRADLEY

What's the Buzz?

"Why do you people in the press have to overhype every new technology and turn every debate into World War III?"

Go on, admit it. You blame us. You think the press is guilty of stirring up the technology pot — pitching each new product as a panacea and creating controversy to sell papers.

Well, you're right — partially. News revolves around the new — new products, new companies, new faces. Controversy and debate make for colorful reading.

But our real job is to help network managers filter out the static and make better decisions about how and where to deploy network products and services. We try to do that every week in *Network World,* every month in *IntraNet* magazine and every day on our Web site, *Network World* Fusion (www.nwfusion.com).

Still, we can always do better, right?

Thus, the first annual Buzz Issue. Herein, we explore the topics the network industry is buzzing about — the most overheated issues of the day. Our aim is to cut through the marketing spiels and rhetoric to tell you what's real and what's not and how to prepare for the changes coming down the road. From thin clients to the Internet as backbone, we've dissected the hype to help you cope with the overwhelming pace of change and the overload of data.

So here's to more rational discussion, more thoughtful debate. We're trying to do our part. After all, even journalists want to be loved.

— John Gallant, editor in chief

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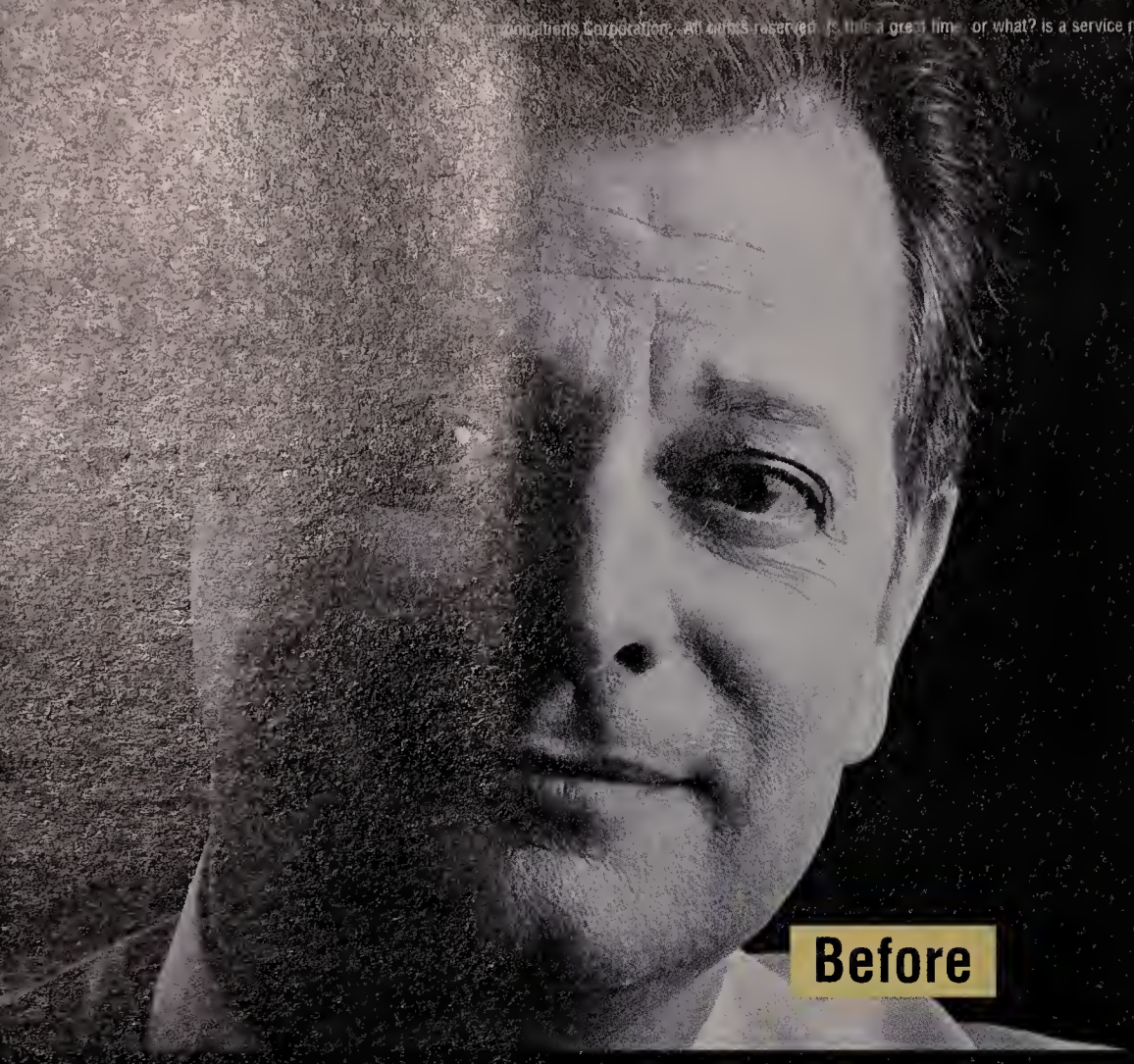

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What's your Buzz IQ?

CHARACTER ILLUSTRATIONS: MARCOS SORENSEN

Are you blinded by the hype? Hip to the happenings in networking? Find out in this special quiz that doubles as a guide to The Buzz Issue. You'll find the answers below and full details in the stories inside. No peeking!

1. Managing to get by.

There are plenty of emerging technologies that promise to make managing your network as simple as falling off a router. But one of the following is a pretender to the future net management throne. Which one?

a) Rules-based inference engines
b) Policy-management systems
c) Remote monitoring reduction engines
d) WBEM

To learn more about the real solutions, see "Masters in management," **page 49.**

2. Heroes of the roundtable.

Network World has the best columnists. No question there. So we brought them together in a roundtable interview aimed at puncturing all the overblown rhetoric. But before you read the interview, let's see how much you know about these pundits. Match the columnists with the facts:

a) Daniel Briere	1) Used to work for Novell UK
b) Christine Heckart	2) These two work for the same consulting company
c) Scott Bradner	3) Won NetWare Users International's Nuggie award
d) Tom Nolle	4) Designed NEARNET
e) Mark Gibbs	5) Scuba dived in the tank at Disney's Living Seas
f) Dave Kearns	

See "Buzz bashing patrol," **page 54.**

SPOT ILLUSTRATIONS: PAUL RODGERS

3. Is your head in the IP cloud?

Using the Internet as your backbone sounds great, but is it realistic? You have to consider reliability, security, quality of service and a host of other issues. Still, a fair number of companies are seriously considering the move. According to Forrester Research, Inc., what percentage of corporations think the Internet could replace other WAN services? (Consider yourself correct if you're within 5% either way.)

See "Juiced up over Internet backbones," **page 66.**

4. Aiiiiieeeee! NT is coming, NT is coming!

If you believe the buzz, NT is taking over the planet, sending helpless victims such as NetWare and Unix to their doom. But NT doesn't do it all (it can't make julienne fries, after all). If you know NT, you'll know that customers' biggest concern about the operating system is _____.

(fill in the blank)

Where else does NT need to improve? See "NT devours New York!" **page 71.**

5. Welcome to Tomorrow-LAN!

Picking a high-speed LAN technology for the future is hardly a no-brainer, what with ATM, Gigabit Ethernet and Layer 3 switching vying for your budget. For a warm-up question, compare ATM with Gigabit Ethernet. Which technology:

- Has more mature standards?
- Will cost less in the long run?
- Is better at handling isochronous, or time-sensitive, traffic?
- Works across WANs as well as LANs?
- Has cabling and distance limitations?

Check out "Speed 101," **page 74.**

6. It's quality, not quantity.

While quality of service (QOS) promises to deliver the goods to your users, it may be a while before it becomes a reality. But we can measure the quality of your QoS knowledge right now. True or false: RSVP guarantees that key applications get the bandwidth they need when they need it. Bonus: What does RSVP stand for?

To bone up on QoS, read "It's Quality of Service, stupid!," **page 79.**

7. The local route to competition.

Telecom reform is a failure. Everyone says so, right? But you're in a better position than you might think when it comes to buying phone service in the local loop. To gauge your local loop savvy, answer this: Analysts say you shouldn't be signing a long-term contract with one carrier for all your local services. But how long-term is too long?

Check out "Nobody's doing the local motion," **page 83.**

8. Attention shoppers: Special on intranets!

What? You haven't rearchitected your network around intranets yet? Before you do, there are some lies, truths and tips you ought to know about intranets. Like what? Well, true or false: You are behind the curve if you aren't implementing multimedia capabilities on your intranet today.

See "IntraMania," **page 87.**

9. EC made easy.

Electronic commerce is easy if you know what key steps to take and what mistakes to avoid. It also helps to know some of the keywords. For example, do you know what SET is? What about FACNET? SSL?

See "Electronic commerce dos and don'ts," **page 91.**

10. You're looking thin!

You can never be too thin or too cheap — at least if you're a client system, right? The theory is thin clients cost less to buy and manage than traditional desktops, but you need to be careful. For a start, do you know which costs more, a Java thin client or a Windows thin client?

See "Thin isn't for everyone," **page 97.**

11. Mommy, the applets are getting closer to the car!

Network computers running cute little Java and ActiveX applets. Sounds great! What you may not know is that all that active content may take a big toll on bandwidth, security and management. Name three ways to minimize the impact of applets on the network.

See "Onslaught of the applets," **page 99.**

12. Know how.

Knowledge management is a hot buzzphrase today and could be a big business by the year 2000, says Gartner Group. How big?

See "Getting to know knowledge management," **page 101.**

13. Millennium madness!

If you think the year 2000 crisis only affects mainframes, you've got some reading to do. Which of the following networking systems also may be tripped up by the Big Date Change?

a) Voice gear like PBXs and ACD
b) E-mail
c) Servers
d) NOSes
e) All of the above

Read "Year 2000: It's a network problem, too," **page 102.**

Answers: 1. c RMON reduction engines (but it sounds good!) 2. a) 2 b) 2 c) 4 d) 5 e) 1 f) 3 3. 45% 4. Implementing NT domains 5. ATM, Gigabit Ethernet, ATM, ATM, Gigabit Ethernet 6. False. And RSVP stands for Resource ReServation Protocol. 7. Anything over one year. 8. False 9. Secure Electronic Transactions (SET); Federal Acquisition Computer Network (FACNET); Secure Sockets Layer (SSL) 10. Analysts say the Windows thin client is cheaper, at least initially. 11. There are a number of things you can do, including distributing intranet servers to improve performance, using RMON2 to analyze traffic and trying out Web browser scanners that warn end users away from dangerous applets. 12. A $5 billion market. 13. e

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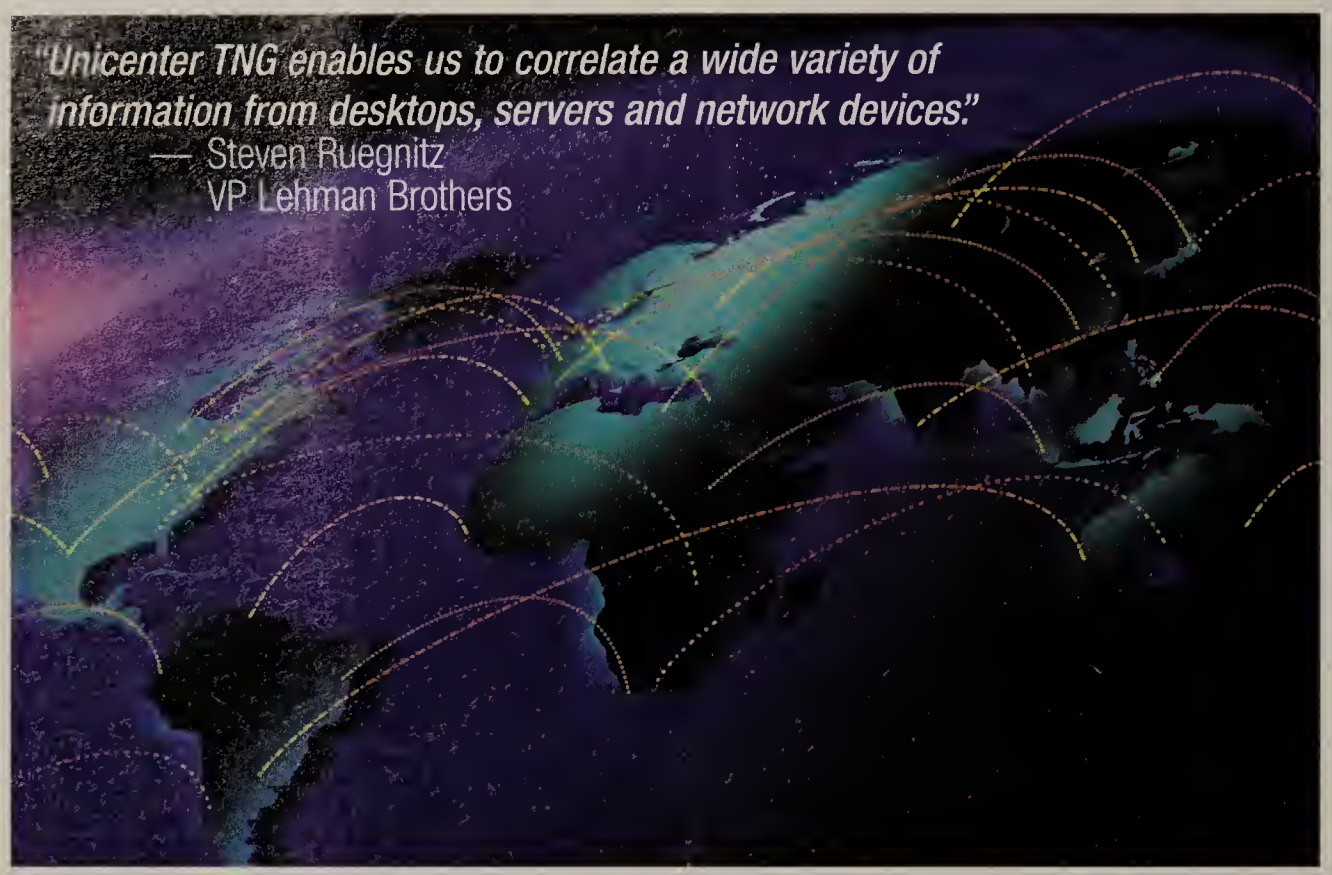

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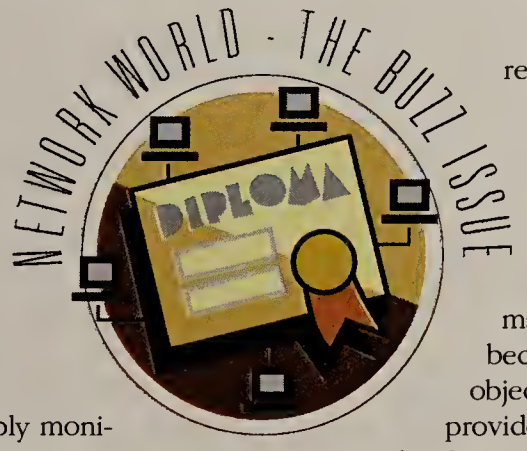
Get your Masters in management

Once you study up on the concepts behind all those catchy phrases, you'll learn what to zap in your search for real management aids.

BY JIM DUFFY

NETWORK MANAGEMENT



It's a faint sound off in the distance, but that buzzing is unmistakable. Suddenly — and sometimes with little warning — it's upon you. It's coming from those clever, handsomely compensated marketeers with all the flip charts, flashy brochures, slide shows and videos they think are needed to get you revved up enough to jump on the bandwagon for the next-generation network management solution.

That's right. They want to sell you a Web-based tool that runs on top of a case-based reasoning platform. It's been integrated with all the best-of-breed Java- and object-based applications that third parties can provide. The goal is to assemble an out-of-the-box solution that will enable you to truly manage the type of IT service levels those cable testers and SNMP device monitors only claim to control. Oh, yeah, it also conforms to all the standards du jour.

After the presentation, all you can say is, "Huh?"

Exactly. Welcome to today's world of enterprise management where, unfortunately, the myriad tools, techniques and technologies grab more headlines than the actual problems you're trying to solve. Trouble is, with new management methods emerging all the time, keeping track of what's real and what's vapor can be more effort than sticking with the work-arounds that tend to get you through the day.

So next time the glitz crew comes your way, be armed with a buzz zapper and use it whenever you hear the terms "service-level management," "object-oriented frameworks," "integrated management platforms" and "artificial intelligence (AI)". These terms are too ambiguous or don't relate to anything that will benefit you.

On the other hand, perk up when the conversation rolls around to Web-based tools that can ease management chores, policy-based management, rules-based inference engines and case-based reasoning. If there's any management buzzwords worth paying attention to, these are the ones.

Overspoken

Be especially quick on the buzz zapper whenever you hear the term service-level agreement (SLA) management. All of a sudden, companies that once sold products to simply monitor network device status, system CPU usage or disk space capacity have gizmos that guarantee you will receive expected levels of network throughput and application performance.

However, if one of these SLA gizmos tells you you're not getting the performance you expected, don't be surprised to learn the company that sold it to you expects you to buy one of its device monitors so you can figure out where the problem is and what to do about it. However, that's not quite the true definition of SLA management.

Truth be known, SLA management is not new. Crafty marketeers looking to extend the life of device monitors borrowed the term from the telecommunications world, where it's been used for close to a decade in a real sense.

SLA management relates to your ability to monitor whether promised service performance guarantees and committed information rates (CIR) are actually being delivered. Even in the telecommunications world, it's still up to you to keep the carrier honest by tracking whether guarantees and CIRs are delivered and to fight for a rebate when they're not. Only recently have some carriers tried to make this task easier by enabling you to tap into their management systems to get the real-time service performance information you need to make a judgment.

Give the buzz zapper some overtime to keep someone from blathering on about an object-oriented management platform, too. There was a day when all management platform vendors talked about making their products object-oriented. Today, few of them are. But does that really matter to you? Probably not, especially when you consider that an object-oriented management platform or framework really doesn't help you do your job faster.

Instead, object orientation's benefit goes to developers who can tap its code-reuse abilities to write new applications faster. Objects won't really add new functionality to the platform itself. They just will give you new applications faster. Sure, some of those applications may make your life a little easier because they can use management objects, but the technology itself provides more of a benefit to the developer.

There is likewise no need to get snowed by the term "integrated management product" because management products are anything but integrated out of the box.

Users say that deploying a vendor's management framework with applications from third-party partners still requires a significant systems integration effort. This is the case even though these partners' products are supposed to be "integrated" with the platform from the outset.

The result is frustration. "We can get [the functionality we need] from third parties, but I don't want to be an integrator," says Dennis Fishback, manager of data processing for Virginia Power Co., in Richmond, Va.

Some users see relief in the recent initiatives announced by market leaders Computer Associates International, Inc. (CA) and Hewlett-Packard Co. to bundle stripped-down versions of their management platforms with systems and servers from multiple hardware vendors.

"Having vendors do that is great," says William Oris, a vice president at investment giant JP Morgan & Co., Inc. "It lessens the amount of integration work we have to do."

Yet the "platform" model of enterprise management itself is quickly losing steam. In addition to the lack of integration, monolithic platforms require too much development time on the part of third-party application developers who have to pick and choose which platforms to support.

If they want their applications to run on all the management platforms out there — and there are quite a few — developers have to write a different version of the same application for each one. This is an expensive proposition for application developers, and they usually pass that expense on to you.

Good terms

Enter Web-based management. The World Wide Web's much-touted promise to make application portability a reality is genuine because Web browsers and Web-based applications, especially those written in the Java language, can run on any platform. "The Web paradigm is certainly the most scalable, the most ubiquitous," says Stephen DeWitt, vice president and general manager of network management at Cisco Systems, Inc. "It gets us out of the age-old, nauseating problem of porting to every platform under the sun."

Consultants agree. "One of my beliefs is things like the Web are going to be the glue, the integration point, rather than the management platforms," says John McConnell, president of McConnell Consulting, Inc., in Boulder, Colo.

Because of its familiarity, portability and user-friendliness, the Web browser is becoming the universal user interface for management consoles. With a browser and the Web, management data can be sent to anyone who needs it.

This data is mostly in the form of HTML-based hot-linked performance reports. But more and more, companies are giving their network managers an interactive, real-time, Java-based Web interface that provides a greater graphical depiction of the managed environment that can be updated in real time.

"We're pleased with a Web interface," says HP OpenView user Sandra Potter, network specialist at Air Products and Chemicals, Inc., of Allentown, Pa. "That helps us a lot. But the second phase is the Java stuff. We're really interested in third parties getting on board [with that]."

She's not alone. "Java will allow us to get [management] information to more people," says Paul Edmunds, senior network analyst at Duke Power Co., in Charlotte, N.C. Java, he says, can lessen the performance hit on management platforms that currently use X Windows.

There are even two standards being proposed for Web-based management: the Web-based Enterprise Management (WBEM) initiative, backed by BMC Software, Inc., Cisco, Compaq Computer Corp., Intel Corp. and Microsoft Corp., but championed mostly by Microsoft; and the Java Management Applications Programming Interface (JMAPI), the brainchild of Sun Microsystems, Inc.

The WBEM concept defines three areas for standardization. One is a HyperMedia Management Schema (HMMS), an extensible data model for representing managed objects. Since WBEM's introduction last year, HMMS has metamorphosed into the Common Information Model (CIM) defined by the Desktop Management Task Force (DMTF).

Another WBEM component is the HyperMedia Management Protocol (HMMP), an HTTP-based protocol for communicating between management services, applications and agents. The last piece is the HyperMedia Object Manager (HMOM), a C++ object broker that will pull together management data on behalf of management applications. HMOM is based on Microsoft's OLE technology.

While the DMTF is defining, maintaining and updating CIM, HMMP is being debated within the Internet Engineering Task Force, and Microsoft has placed a reference implementation of HMOM in the public domain. To date, there has been little, if any, activity around HMMP.

Vendors were expected to release WBEM-compliant products by now. But don't hold your breath. WBEM is seen by many industry insiders as a ploy to get you to buy into Microsoft products. As such, vendors will likely only pay lip service to WBEM while pumping out Web- and Java-based tools independent of it.

Speaking of Java, Sun is one of the vendors conspicuously absent from the WBEM bandwagon. That's because Sun and Microsoft are at odds over how Web-based management should evolve.

JMAPI is part of SunSoft, Inc.'s Java-based Solstice Workshop, a programming environment for developing Web-based network and systems management software.

A number of third-party vendors have endorsed JMAPI, including management rivals CA and IBM's subsidiary Tivoli Systems, Inc., because of Java's "write-once, run-anywhere" properties.

Because Java is real, you can expect vendors to fulfill their promises to deliver JMAPI-based software later this year and early next year. In fact, Tivoli is committing to ship its Java-based Tivoli Management Environment (TME) framework in mid-1998, according to CEO Frank Moss.

Tivoli was one of the early adopters and proponents of object-based enterprise management and even contributed object technology to the Open Software Foundation's ill-fated Distributed Management Environment. But Tivoli now acknowledges that the Web is the next wave.

Web technologies aren't the only real hot button in enterprise management. Policy-based management also is getting a lot of attention, and rightly so.

The ability to establish policies for how your network will be managed — defining what application will be launched based on certain events or establishing network access rights based on user profiles — will go far in automating management or making networks more self-manageable.

The major internetwork vendors — Bay Networks, Inc., Cabletron Systems, Inc., Cisco and 3Com Corp. — all support policy-based management in one form or another. Also, the major enterprise management framework vendors — CA, HP and Tivoli — support policies for monitoring network and systems usage and health.

Policy-based management could have been augmented by AI, that "next great thing" of the mid-1980s. Trouble was, users were so squeamish about letting computers decide how to manage their computers, AI never took off.

So AI in network management these days is being called rules-based intelligence and case-based reasoning, which really isn't AI at all.

Rules-based tools foster automated management by initiating alarms or remedial action via predefined rules programmed into a management station by — you guessed it — people, whether you or a vendor.

Case-based reasoning tools are essentially a repository, or library, of problem-solving expertise culled from your staff or the tool vendor's staff and programmed into an application. Case-based reasoning enables you to view present cases or develop a case and decide how to solve a problem based on information stored in the repository.

The computers used with rules-based and case-based reasoning tools are not thinking for themselves as they would in true AI. Rather, they preprocess data so you can solve problems more quickly or automate responses to conditions you've programmed in.

There are a couple of variations of rules-based intelligence in network and systems management: knowledge modules and inference engines. Both require that rules for inferring causal relationships be predefined by vendors or users.

Knowledge modules are behind BMC Software's Patrol application management suite. These software modules are loadable libraries of expertise containing rules for how Patrol will manage an operating system, database or application.

NEWS YOU CAN USE

Hype or hope?

Management buzzword	Pro	Con
• Service-level management	• Nice idea to manage network services instead of network devices	• Everything being pitched as service-level manager, but not everything manages services
• Object-oriented development	• Allows developers to reuse code	• Little or no benefit to end user
• Integrated management tool	• In theory, would allow apps to share data, interoperate	• Little integration actually realized; requires extensive IS work on part of end user
• Platforms	• Centralized single point of management	• No app portability; developers must pick and choose, leaving users without apps for certain platforms
• Web-based management	• Any time, anywhere, any platform	• Too new to determine if ready for prime time; possible security issues
• Policy-based management	• Guidelines for the way environment is managed; automation	• A new concept that needs to be tested under industrial-strength conditions
• Artificial intelligence	• Automation; self-healing networks; various subsets workable	• What happens if "intelligent" computer fails? Which method will be used — rules-based or case-based?

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BMC predefines knowledge modules for specific environments, such as Lotus Notes, SAP R/3 or Oracle database management systems.

Inference engines are exactly that: They provide a way for a management system to infer the likely cause or remedy of a network or system fault from the events that result from the fault. This ability to infer is preprogrammed into the engine based on the past experience and knowledge of a network manager.

If a new method is used to remedy a fault, the manager updates the inference engine with this new cause-and-effect scenario.

Seagate Software, Inc.'s NerveCenter event correlator is a good example of a rules-based inference engine. NerveCenter uses color codes to display varying user-defined degrees of event severity on the management console screen. It also can initiate user-defined responses to error conditions, including sending an e-mail, dialing a pager number, automatically starting corrective actions by launching applications and displaying instructive text for users.

Case-based reasoning works under a different model. With case-based reasoning, the network manager can peruse present cases to determine if a similar fault has occurred and been previously fixed. Or, if a new method is needed to fix a problem, the manager can develop a new case and enter new problem-resolution information into the case-based reasoning repository.

Case-based reasoning is available as an option on Cable-tron's Spectrum management platform.

Cabletron's case-based reasoning tool also can interface with trouble-ticketing, help desk and call-tracking systems so users of those systems can tap the problem-resolution repository for more rapid troubleshooting and escalation.

So what's the benefit, if any, of rules- vs. case-based reasoning? Case-based reasoning has the ability to retain knowledge that is otherwise lost because of personnel turnover and attrition. Case-based reasoning also is adaptable to a particular network operation because managers can update the case-based reasoning database with new techniques.

This makes case-based reasoning more advanced than rules-based reasoning. Because rules-based systems rely on predefined rules or conditions to deal with unforeseen situations, they lack the ability to adapt existing knowledge to a novel situation, or to learn from experience, which is what a true AI-based tool is supposed to do.

And learning from experience may be the only way you can differentiate hype from help in enterprise management.

Maybe those that learn from experience can develop that Web-based, case-based reasoning platform that's integrated with best-of-breed, Java- and object-based third-party applications out-of-the-box. And maybe this gizmo can truly manage IT service levels that the cable testers and SNMP device monitors only claim to control.

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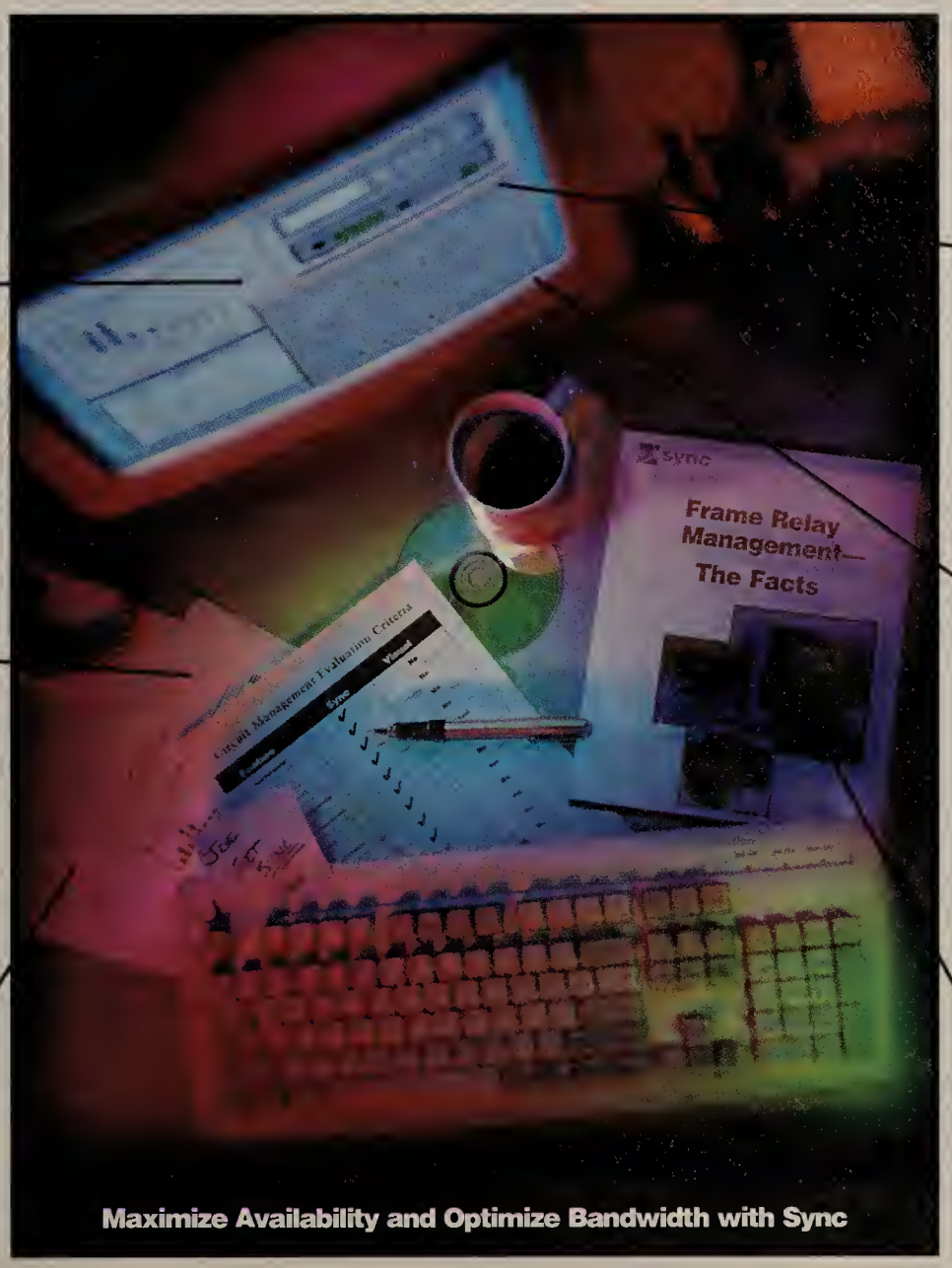

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Buzz bashing p

Network World columnists ride herd on the hype.

To protect and serve. That's the motto of the Buzz Bashing Patrol.

For this special roundtable interview, we pulled together an elite group of analysts and consultants — elite because they are *Network World* columnists for one thing — and asked them to take a stand on some of the most talked-about issues in the IT industry today: Gigabit Ethernet vs. ATM, Windows NT vs. the world, intranets and more.

They are the Buzz Bashers, hype-fighting action figures whose mission is to help you untangle all the acronyms and make better decisions.

They are (from left, below) Daniel Briere and Christine Heckart, president and director of broadband, respectively, of TeleChoice, Inc. in Verona, N.J.; Scott Bradner, a consultant with Harvard University's University Information Systems; Tom Nolle, president of CIMI Corp. in Voorhees, N.J.; Mark Gibbs, president of Gibbs & Co. in Ventura, Calif.; and Dave Kearns, a freelance writer and consultant in Austin, Texas.

In addition to the wisdom they impart on these pages, you can find the full text of this Q&A — including additional questions on network management, telecom reform, electronic commerce and the year 2000 crisis — in the special Buzz Issue section of *Network World* Fusion (www.nwfusion.com).

Many readers have expressed confusion in trying to formulate a LAN backbone strategy. There's Gigabit Ethernet, ATM, Fast Ethernet, IP switching — in short, no shortage of technologies but no clear direction. What are the real issues network managers should consider when planning for a next-generation network?

NOLLE: The biggest issue is incrementability. The best backbone technology will be one that can be added to existing networks without creating a lot of ripple impact and ripple cost. That means ATM or Gigabit Ethernet can work, as long as both are about the same cost. Bits for bucks is the game, now and forever.

GIBBS: The real issue: Can you afford it now? To go for a major implementation now is most definitely to be donning the leather helmet and goggles of the test pilot. In six months to a year, the key issues of this new era of high-speed backbone choices will start to become clearer: which standards matter and which don't, which vendors will be stable, and how problematic the technologies will be from the viewpoints of implementation and ongoing management.

HECKART: There are really only three issues that need to be considered in this type of purchase: cost, performance and longevity. What is tricky is that we tend to think about these issues as having absolute values, and they don't — everything is relative to the customer's environment, goals, applications, budget, etc. What's good enough for one company, or even one set of users, doesn't hold water for another. The trick is to figure out what "good enough" means and implement the solution that is cheap enough, performs well enough and lasts long enough to meet your current and foreseeable needs. The problem faced by many users is that they try to figure out what's best. Best changes every week based on changing needs and the latest and greatest technology. Best never exists and can't be implemented because by the time it is implemented, it isn't the best anymore.

BRIERE: Too many managers are purists and look for homogeneous answers when a mix is going to be the result. In any company, you might find ATM, Fast Ethernet and Ethernet or some other combination because different sites and groups are going to have different needs. The most important thing is to let the requirements drive the solution and not get hung up on the latest and greatest technologies.

KEARNS: The majority of network connections are Ethernet and will continue to be. There's no gripping reason to go to a different backbone technology at this time. Ten megabits to the desktop and 100M bit/sec on the backbone works and works well for many, many installations.

Planning to add Gigabit Ethernet as the backbone with 100M bit/sec moving down to major trunks and eventually to the desktop seems a reasonable approach.

The gotcha here is that for many networks, bandwidth isn't the bottleneck. Server/router/

ILLUSTRATION: AMANDA DUFFY

atrol

NETWORK WORLD - THE BUZZ ISSUE

BUZZ BASH

ROUNDTABLE INTERVIEW

switch throughput, disk channel, bus speeds, local node buffering and probably five or six other things all need to be considered. A pipe that's too fat simply wastes resources.

BRADNER: I'd say the biggest challenge for network designers is the partial knowledge and strong convictions of their management. All too many decisions on the future directions of corporate networks have been based on broad generalities rather than on an analysis of the actual needs of the existing network community. Someone from management reads the pronouncements of one of the big consulting companies — "The answer is ATM (what was your question?)" — and decides on the future direction.

The real need is to do a technical analysis of the specific network requirements and design based on the results of the analysis. Many technologies can prosper because not all networks are the same.

ATM vs. Gigabit Ethernet: Is this a real battle or nonsense?

NOLLE: It's really a battle of planning paradigms that happens to be represented as a battle of technologies. The Gigabit Ethernet paradigm says, "Buy bandwidth instead of bandwidth management because bandwidth is cheap enough to oversupply your network." The ATM paradigm says, "Bandwidth management is important; capacity can't be taken for granted, so you'll need a network architecture that can manage capacity for you." Cost will probably decide the issue, but there's no question that buyers will feel a strong attraction for the simplicity of the Gigabit Ethernet approach. The problem we have with the battle is that we want it to be technical, based on features. It's not that way.

GIBBS: Yes, it is real. And the reasons are that lots of money has been thrown at the former and lots of money could be made from the latter — if the latter is that much easier and cheaper than the former. The ATM vendors don't want to see their investments wiped out, and over the next six months, they will all be doing their best to hurl sticks and stones at the gigabit boys.

HECKART: What's nonsense about this and other ATM-related topics is that the message gets broadcast out to the masses when it's only applicable to the networking elite. This is a real issue for a very few people. But Gigabit Ethernet has the high ground, the bigger army, a better supply chain and nearly everything necessary to win a war. ATM may have somewhat smarter troops with slightly fancier weapons, but better numbers and positioning usually win. For any buyer that doesn't need the extra capabilities provided by ATM — namely guaranteed [quality of service] — the easiest solution is just to avoid the battleground and use what's most comfortable and what's good enough. Unlimited bandwidth can't fix every network problem, but it can fix most, and Gigabit Ethernet starts to approach unlimited bandwidth for many environments.

BRIERE: It's the classic elegant vs. entrenched battle. If you win enough battles, then you win the war. You're going to see a lot of ATM implementations by the telcos into the home and probably into the office, as well. Carriers like Ameritech, PacBell, SBC and BellSouth have already stated that ATM to the home and office is important, so the question becomes: How far will it go into the home and office? If you have ATM into the home feeding five devices, is that a home LAN? Yes, probably. So ATM will be more pervasive than most people think.

KEARNS: It's a real battle in a marketing sense, but outside of the hype market, it's a no-brainer. Gigabit Ethernet will be the dominant technology for the same reason 10M bit/sec Ethernet dominates token ring and 100M bit/sec Ethernet dominates FDDI. More network managers understand Ethernet and have a high degree of comfort with it.

BRADNER: In the campus backbone network, it is a real battle. It is quite easy to figure out that Gigabit Ethernet will easily and cheaply (relative to ATM) meet most, if not all, current requirements for campus backbones. The only area where there is a significant question is that of QoS. But few of today's campus networks actually use any QoS capabilities because of the existing application set and because the network link to the desktop is almost all Ethernet and token ring, which do not support any QoS functions. It is no battle in the WAN arena.

Gigabit Ethernet does not go very far (3 km max.) and requires private fiber. I doubt it is much of a battle in the building backbone either, with Fast and Gigabit Ethernet wiping out ATM as a player.

Pundits are talking about network-centric computing, meaning we'll shift from these heavy apps-laden desktops to thinner clients running Java and ActiveX applets. What's wrong with this story?

NOLLE: It's crap. It's nothing but a tired rehashing of the old diskless workstation concept. Dumb terminals can be replaced by semi-dumb network computers. Smart PCs won't be.

GIBBS: Nothing is wrong with the story. But there are some problems with it. Migrating to thinner clients is complex, and it will take quite a while for the leading application vendors to make any significant inroads into migrating their products to the new world order. The [network computer] thing is a nice idea but a little short on practicality — you don't dispose of an installed base in less than about three years, by which time the next generation of desktop applications will have come along.

Not all the problems of dealing with fat applications go away. For starters, NCs will demand much greater network bandwidth than current applications, and the increased server processing and storage demands will be huge. Also, security, security, security. We don't know what the security implications are of Java applets or ActiveX, although the latter has a far less convincing story to tell than the former.

HECKART: I'd rather say what's right with the story. We all know that the problem being addressed is a real one. We're tired of installing this year's software only to have every last inch of disk space eaten up on our computer that last year was totally state-of-the-art — especially when 90% of the functionality in those zillion lines of code aren't even used 98% of the time. Downloading what you need when you need it is a great idea.

The critics of this idea seem mainly to be in two camps: the something-to-lose category and the give-it-to-Mikey-he-hates-everything category. Those not already positioned to benefit from network-based computing or already supplying the competitive solution can find lots of bad things to say about it. Just like we can find lots of bad things to say about the way it's done today. The other naysayers are often consultants since we make money telling people why things won't work, or those that criticize every new idea until they see proof that there is demand.

What's exciting about NCs is that they could reshape the way networks are built, software is sold and network services are defined. And probably all for the better.

BRIERE: I think people are overdramatizing this whole battle. We're working with some clients who are looking to create the next generation of fax devices for IP transport. These have elements of what you are talking about. Do we consider them thin clients or slim PCs or anything else? No, we consider them fax devices that solve a specific solution in the marketplace. Again, elements of a device can have different characteristics, and the penchant for labeling things one way or another is annoying.

The network is going to be centric for some tasks and noncentric for others. Taken as a market whole, one will win out, but is that really important for a given user looking to solve specific needs? We've seen a global retailer evaluate NCs and a souped-up smart phone for the same task. Is one more net-centric than the other? It depends what you need that device to do.

KEARNS: Today's programmers don't understand tight code anywhere near as well as yesterday's did — say, 10 to 15 years ago or longer. What we're liable to see are today's apps broken into many, many modules. Users will spend lots of time waiting for each module to load across the net and will reject the technology.

BRADNER: There is not all that much wrong with the story other than it seems to assume a homogeneous requirement domain. There seems to be some deep need to find one answer to all possible questions — maybe because reality is too confusing. There are lots of places where the existing applications are dumb terminal- or X-Window terminal-based and the thin-client/network computer model will work just fine. But there are many other places where the users are doing just fine doing local work on their local computers where the fit is not nearly as good.

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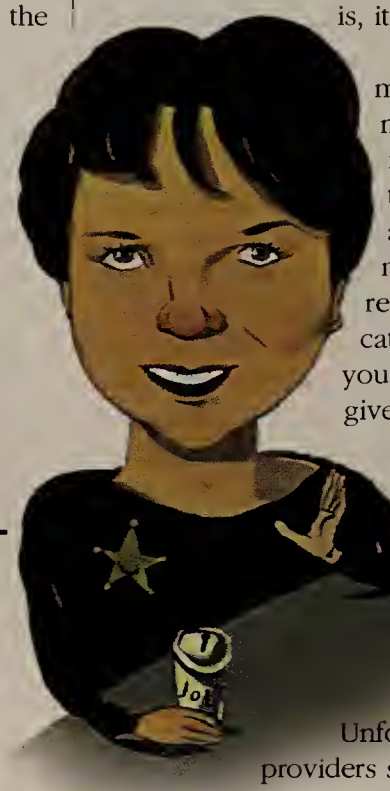
Christine Heckart, director, TeleChoice



AMANDA DUFFY

Another term making the rounds these days is "quality of service." What are the key QoS elements network managers should be concerned about, and how should they be working toward achieving them?

BRADNER: This is a very old story, going back to at least 1964 and the first discussions about doing packet- rather than connection-based data networks. The traditionalists have been decrying packet-based networks ever since. For years, but thankfully no more, IBM speakers claimed that you could not build a corporate data network using TCP/IP because it is based on individually routed or switched packets rather than being connection-based, and the corporate network needed QoS, which they claimed would only work with connection-based networks.

There are three types of QoS that are reasonable to talk about: probabilistic QoS, where there is a high probability that there will be enough network and server resources to get the tasks done in the required time; instance-of-application QoS, where specific resource reservations are made for each individual IP phone call or other resource-demanding application when it is run; and class-based QoS, where network uses are divided into classes and traffic for the classes is handled differently by the network.

Probabilistic QoS is where most networks are today, and that works quite well in bandwidth-rich campus environments. I'd vote class-based QoS as most likely to succeed and instance-of-application QoS as a pipe dream with far too many scaling, authentication and accounting issues to succeed in the real world.

NOLLE: QoS is actually pretty well defined, even if everybody doesn't agree that's so. Peak and average data rate, delay and delay jitter and discard or error rate are pretty well accepted as the key parameters. The question isn't what QoS is, it's what you do to get it.

There are two choices: manage capacity or buy more of it. The network manager has to figure out the cost of each approach and balance them, but the manager also has to remember that resource allocation is like taxation — you've got to rob somebody to give to somebody else. That's why just buying bits per second is so attractive an option to users.

HECKART: This problem of defining what QoS means is going to get much worse before it gets better. Unfortunately, many service providers still think that defining meaningful QoS involves performance metrics that take a Ph.D. to understand and a protocol analyzer to prove. So what's the benefit to the end user?

Sprint has the right idea in delivering predefined service qualities that map to specific user applications. While the model can be improved upon, all the providers need to remember the KISS principle (Keep It Simple, Stupid). What most managers are concerned about is network availability (uptime), response times and throughput. In some applications, like real-time voice, you can add the variation in network delay to this list.

What should concern managers most about the past definitions of QoS is the near impossibility of proving whether you're getting what you were promised. The ideal provider makes the QoS easy to understand, easy to measure and includes an automated and meaningful penalty for nondelivery. The good news with QoS is that it will help users to distinguish between different services to better understand how frame relay, Internet service, private lines and ATM compare against each other for meeting the needs of a location or application.

BRIERE: I think of QoS in an ATM/WAN type of way, where select applications have different access to different resources depending on what they are trying to do. Network managers will

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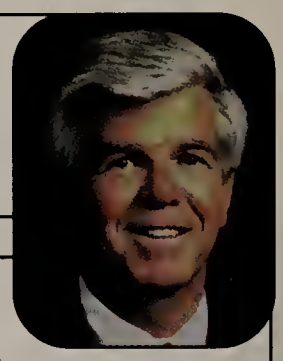

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The overwhelming success of public frame relay and the promise of ATM and Internet VPN services signifies the dawning of a new era in enterprise wide-area networking. As customers "out-task" their WAN to service providers, support of high-availability applications becomes a cooperative effort. The New Sync is dedicated to providing end-users and service providers with advanced WAN access and service-level management solutions that enable this shift to "cooperative networking" for business-critical applications.

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One of the biggest challenges facing IT managers today is the cost and complexity of managing heterogeneous environments. Tivoli is making it easier to use our products with a Java-based framework and high-level integration with third-party partners. We are committed to driving an industry based on openness and freedom of choice. For our customers, openness means they can manage the growing complexity of their IT resources and deliver true business value to their companies' bottom line.

Kevin Hafer

President and CEO
Apex PC Solutions

Our clients know that as their IS needs change, they can count on Apex for answers. This responsiveness comes from years of collaboration with both end user and industry-leading OEM customers. These partnerships have enabled us to anticipate industry trends, adapt to changing technologies and develop the most efficient products.

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need to quantify their needs in order to take advantage of QoS. This goes back to really understanding what each site and application requires, recognizing that no single solution is going to win out.

KEARNS: To the user, QoS means "Can I do what I want, when I want to?" To the net administrator that translates to access, throughput and directory services. Access: 100% uptime for all services via clustering and redundancy. Throughput: predictable throughput, all the time, any time. Directory services: easily locatable objects and services.

Back on thin clients for a moment: We have NetPCs and NCs, each promising to reduce network/systems administration costs. Will they really provide the big savings people expect, or will they wind up costing more on the network and server side?

KEARNS: There's a big difference between the NetPC and the NC. It's the NC that'll need bigger servers and bandwidth. But either way, there will be costs involved — new equipment, new infrastructure, training and support.

NOLLE: Stockpile them next to the diskless workstations. Turn them into space heaters or attractive, high-tech metallic collages on concrete pedestals in front of headquarters. NCs are replacements for dumb terminals. NetPCs are just hype.

GIBBS: The wise *NW* reader should tread carefully. There isn't yet the catalog of applications and tools that make for a convincing story, and the infrastructure upgrade costs are significant. Plus, most IS shops will have two or three years before they have fully amortized their existing investments, so leaping into the fray is probably not an option for more than trial systems. That said, trials with suitable victims … er, guinea pigs … er, users will be invaluable. Definitely a market to watch, but I wouldn't recommend getting too excited until there's a realistic story with applications and NC/NetPC system, not just unit, pricing.

BRADNER: I see no real differences between NetPCs, NCs and terminals, and I doubt that there will be any significant cost differences between them. A corporation is not going to save any real money by tossing out old 3270 terminals and putting in NCs instead (except for the repair costs of the 3270). I would also doubt that there will be much savings in moving from 'real' PCs to NetPCs or NCs. A whole pile of the costs are common — training, software, etc. — and I'd expect that many of the other costs will balance out. There is one substantive difference between distributed PCs and the alternative, and that is the re-empowerment of the corporate IS department — traditionally not the most cost-efficient part of the corporation.

To hear some people talk, intranets are the corporate computing platform today. But what should reasonable people really be working toward with intranets, and what applications will never be intranet-appropriate? What's the biggest mistake people are making when it comes to intranets?

HECKART: Intranets are appropriate when information needs to be widely accessible to a number of people or when collaboration is

AMANDA DUFFY

"ALL TOO MANY DECISIONS ON THE FUTURE DIRECTIONS OF CORPORATE NETWORKS HAVE BEEN BASED ON BROAD GENERALITIES RATHER THAN AN ANALYSIS OF THE ACTUAL NEEDS OF THE EXISTING NETWORK COMMUNITY. SOMEONE FROM MANAGEMENT READS THE PRONOUNCEMENTS OF ONE OF THE BIG CONSULTING COMPANIES — 'THE ANSWER IS ATM (WHAT WAS YOUR QUESTION?)' — AND DECIDES ON THE FUTURE DIRECTION."

Scott Bradner, consultant, Harvard University's University Information Systems

desired. This is why networks are built in the first place. The two biggest mistakes being made are that many users don't go into building an intranet with a clear understanding of what they hope to achieve, thus they never know whether they did. And they are building many separate intranets — different intranets for different communities of interest and using different network facilities. That diminishes the economies of scale and the total savings.

NOLLE: Not knowing what one is. We've found in surveys that while over 90% of companies have a commitment to intranets, only about 7% really have an idea of what an intranet is, how it would be different from just a corporate information network or an IP network. If you start with an objective view of what an intranet is, there is no application limit to one — any more than there is to any other data network — except cost.

GIBBS: The applications that will never be intranet-appropriate are those with heavy or complex database demands or where complex functionality, such as dynamic multimedia in a real-time environment, is involved.

BRIERE: The biggest mistake people make with intranets is assuming they are missing out on something. But I will say that a good manager should define an intranet very generally as almost any information that needs to be shared internally and start prioritizing the benefits that would be gotten the soonest and with the biggest bang for the buck by migrating to an internal information backbone or intranet.

KEARNS: An intranet is a good way to reduce the use of paper while delivering data in a more timely manner. The best uses so far are distribution of human resources, PR and marketing information; forms automation, such as expense reports and vacation requests; and project management, where you can combine typical timeline information with a data repository. Data entry apps aren't yet ready for the intranet, though.

The biggest mistake people make with intranets is abysmal design. The intranet has to attract users in much the same way an Internet site does. This requires paying close attention to design issues as well as quality of service.

BRADNER: Another case of pundits seizing on something as a common answer without considering the actual needs. Intranets, and by that most people seem to mean Web-based services, is a rather common answer these days. I think that within a very few years, TCP/IP will be *the* network protocol in almost all corporate networks, with only legacy SNA as an alternative. But I'm not that sure we know what the application set will be. One can force-fit heavy data-entry applications into Web- and Java-based systems, but for many of these, application-specific software on the desktop seems to be a far better idea.

One big mistake I keep seeing is to place people in charge of the corporate intranet whose training and expertise are in IBM SNA networks. The TCP/IP clue density is more than a bit low, and there is little language in common between these people and people who actually understand TCP/IP networking.

We keep hearing that telecom reform isn't happening. But what's really going on in the telecom industry today, and how should customers be taking advantage of the trends?

NOLLE: Reform is happening at exactly the pace expected — slow. The telecom act won't really kick in until some time in 1998. Then the biggest impact will be on services at fractional and full T-1 levels, where copper-based provisioning is involved. There will be competition in major metro areas only, however, and the focus will be on services that cost more than $200 per month. Buyers will need to be flexible in the first three years or so (until about 2001) to take advantage of new deals. Keep contract terms short, and avoid minimum carriage clauses to get discounts.

GIBBS: From my perspective — that is, as a nontelecom analysis type of guy — pricing seems to be improving most for WAN data connections, making for cheap interconnections via the Internet. Routing as much traffic as possible over Internet links makes a lot of sense. That includes telephony.

HECKART: There is not much for customers to take advantage of yet — at least as a result of the last attempt at reform. What any customer interested in better future prices and services needs to do today is to vote with the pocketbook. Give some of the budget to the competitive service providers — especially in the local area. If you say you want choices but always give your network to the big provider, you're

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perpetuating the problem. Money talks, and without revenues and customers, the competitive providers won't survive.

BRIERE: Look, when reform first happened, we warned people not to expect it any time soon because it'll be tied up in courts forever. This is still what we are saying. Everyone is finding out it's more expensive, more complicated, more damaging, more trouble and more market-upsetting than initially imagined. Washington classically figured it could come in and remake the industry overnight, and it was wrong. If anything, events have shown, again, that Washing-ton has a very hard time controlling the marketplace with all the forces at work. The consolidation was not expected, nor was the slowness of entry into new markets. Everything is slowing down and costing more, and Wall Street is getting nervous about future earnings as a result.

In roundtables, many readers have said they would like to move, long term, to the Internet as their corporate backbone. Is this a reasonable goal?

NOLLE: That's a view colored by an unrealistic set of economic assumptions. People see unlimited Internet access for 20 bucks a month and think, "Gee, that's 28K bit/sec for 20 bucks. With economy of scale, I should be able to get an Internet T-1 for about $140." Bandwidth costs, and somebody always pays for that cost. In the Internet, there's a transfer subsidization; low-usage users pay for Internet hogs. If corporate America jumped in on the unlimited usage bandwagon, the ISPs would sink in a week. The Internet doesn't have lower cost. It has, for some buyers, a lower price, but that price can be sustained only if a lot of people don't take advantage of it.

GIBBS: Yes. The pricing incentive is there and, combined with VPNs and ISPs willing to contract to QoS goals, it makes for a plausible story. Companies should shed as much of their private infrastructure as quickly as possible.

HECKART: What these companies mean is that they'd like a cheap and ubiquitous network that also performs well for a variety of uses. For some remote locations, the Internet meets these goals well today. For many locations and applications, today's Internet doesn't fill the bill, but some version of the Internet may tomorrow.

Most likely we will find the industry moving toward a variety of interconnected intranets, extranets and internets designed to support different applications and different communities of interest. These intranets, value-added data networks and trader networks will become available over the next few years and will largely supplant private and public data network services today for voice, fax, video and data applications. These services will not be rock-bottom priced for all you can drink, but they will be orders of magnitude less expensive than private networks.

SIEMENS

The first thing we did was put ourselves in

The biggest barrier to this future reality is not the technology, but the huge amount of revenues held by the incumbent service providers that would be substantially reduced in a rapid migration to Internet-based services.

BRIERE: There's no reason why you cannot have intranet applications accessible to corporate frame relay or ATM nets, too. Why would you want to discount that? You've got solutions that are going to be accessible by a wide variety of networks, and limiting it to the Internet is a mistake. That's only one mode of transport.

KEARNS: It's not a reasonable goal at this time because it places the backbone beyond the control of the company. At best, the Internet should be considered as a backup to use when the company's private backbone fails. It's not worth a few dollars in savings to give up the reliability, control and security of private networks. Maybe when the CIO gives up his car and starts riding the bus....

BRADNER: Would the pundits feel better if it was called a national, telecommunications company-provided data infrastructure instead of the Internet? That is what the Internet is becoming, it is what the supporters of the National Informa-tion Infrastructure, so touted by the government and the press a few years ago, thought was going to replace the Internet. I disagree with the assumption that private networks have features that the Internet does not, especially as almost all corporate wide-area private networks are now running TCP/IP. It is hard to distinguish feature-wise between a private network and the public TCP/IP networks. I expect class-based QoS functions to become widely available in the public Internet over the next few years and remove just about the last definable advantage of a private data network over using part of the public one.

Is Windows NT going to take over the world? What are the weak spots in the NT story?

NOLLE: NT has already taken over the world, but the Unix players don't know they're dead. The stories on NT's weak spots are important, but the most important feature of any operating system is that users can relate to it. They relate to NT better than to any other server or multiuser platform. Go ahead and send snotty e-mails, Unix fans; I'm only telling the future, not making it.

GIBBS: The anti-Microsoft camp waving the Java flag is in high gear, and that indirectly weakens the NT story. NT 4.0 is, without doubt, a great OS, but it doesn't fit every IS need anymore than NetWare or Unix does. I'd place NT in a dominant position but not the flat-out winner.

KEARNS: NT is well on its way to reducing Unix to a niche market as an application server. It's still a long way, though, from dominating the network operating system market and may never get close since Microsoft appears doomed to never understand networking. It's a desktop company and will always be a desktop company.

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Juiced up over Internet

There may indeed be savings to reap by migrating WAN corporate data traffic to the IP cloud, but tread carefully.

BY DAVID ROHDE AND DENISE PAPPALARDO

Is everyone from the CEO to that techno-wannabe in accounting telling you what to do with the Internet? Are you wondering whether you could save a bundle by migrating your backbone to that IP cloud?

Relax. Determining whether the Internet represents a viable alternative to WAN technologies such as private lines and frame relay should depend on traditional analysis, not pronouncements from the corner office or from Tim Berners-Lee.

That said, there is growing confidence in the Internet as a wide-area transport, and there are often savings to be had if you have applications that can suffer the slings and arrows of the 'Net: namely, lax security and flaky performance.

Some users are trading in frame relay or leased lines for Internet links, says Eric Paulak, senior analyst at Gartner Group, Inc., a Stamford, Conn., consulting firm. But most are simply using the Internet to supplement their WANs.

"Large customers can still justify their private networks," adds Allan Sulkin, president of TEQConsult Group, Inc., a consulting firm in Hackensack, N.J. "There are too many problems with the Internet."

In fact, it will take some industries far longer than others to find ways to stir Internet links into the wide-area mix.

A case in point is banking. Although they are making progress getting consumers to use the World Wide Web for some basic banking business, banks have been slow to use the Internet for internal links for obvious security reasons.

Security is perhaps the single biggest factor giving would-be Internet users pause.

But the risks of data being exposed while traversing the Internet are overstated. Moreover, today's firewalls, encryption and authentication tools are adequate for safeguarding all but the most critical information. The potential cost savings of using the Internet for transport will often outweigh the risk of exposing corporate data.

In fact, some companies are already trusting critical data to the Internet, but admittedly they are typically companies that never were overly concerned about security to begin with.

STEVEN BORNS

"MAKE SURE YOU HAVE SOMEONE ON YOUR STAFF THAT HAS DONE [IP NETWORKING] BEFORE. THIS IS A COMPLETELY DIFFERENT WAY OF LOOKING AT THE WORLD."

David Norton, chief network architect, Trane

THE INTERNET

It starts with cost

You wouldn't even consider using the Internet in place of conventional WAN transport options unless it could save you money.

But can it? On the face of it, yes. Let's break it down.

With UUNET Technologies' ExtraLink managed extranet service, for example, each burstable T-1 (1.544M bit/sec) connection into UUNET's IP cloud costs $1,700 per month for 128K bit/sec worth of throughput.

Traffic can burst up to the 1.544M bit/sec port speed at any time. UUNET samples customer usage every 5 minutes, and if it is at or below 128K bit/sec 95% of the time, customers will pay their presubscribed rate of $1,700. If usage is higher for two consecutive months, users pay more (see graphic, page 68). The base price includes management of your company's routers.

Compare that $1,700 per month with a Sprint Corp. T-1 frame relay port that has a 128K bit/sec committed information rate (CIR), which costs $2,300 per month for each permanent virtual circuit (PVC). Although you can burst above the 128K bit/sec CIR at any time, you run the risk of packets being discarded if the network is congested. And if you want to make this a managed service, add roughly another $300 per PVC.

The cost difference is even more pronounced when you compare frame prices with nonmanaged Internet links. UUNET's plain vanilla Internet service accessed via a T-1 pipe and supporting 128K bit/sec worth of throughput costs $1,295 per month, about $1,000 less per month than frame relay.

That difference diminishes at higher speeds. There is only a $200-per-month difference between a nonmanaged Internet link supporting 512K bit/sec throughput and a similar frame relay link.

While dollar for dollar the Internet service appears to be less expensive, there are a couple of things to keep in mind. First, carriers such as Sprint typically offer volume discounts. And second, the prices don't take into account equipment you might need to secure the Internet to your liking.

In the Internet's favor, however, is the fact that it is inherently a meshed network. Don't be fooled by the typical depiction of a frame relay network as a cloud. Most frame relay networks today are priced out as star networks, and if you want it to be fully meshed, you have to buy additional PVCs.

Caught in the mesh

The meshed nature of the Internet was one reason why Trane Co. of La Crosse, Wis., chose to migrate its private-line network to a virtual private network service from ANS Communications, an Elmsford, N.Y.-based Internet service provider.

Trane, one of the nation's largest heating, ventilation and air conditioning companies, is an IP pioneer, earning that title by moving its 12,000 employees onto the Internet nearly four years ago.

The company had an IBM SNA network supported by private lines but wanted more flexi bility. Instead of buying into the service du jour, it bypassed frame relay entirely and started linking its 120 sites to ANS' backbone via dedicated 56K bit/sec lines. All locations now are up and running, and Trane is looking to upgrade some of its main offices to T-1 and 256K bit/sec lines, says

backbones

David Norton, chief network architect at Trane.

Why choose a public IP network when mission-critical applications are at stake? "We wanted to build a dedicated mesh network because it was the most flexible," Norton says. A fully meshed frame relay network simply cost too much and was not as flexible as an IP-based network.

Crunching numbers

So all that translated into big savings for Trane, right? Not so fast.

"Right out of the gate we were spending 33% more on our network, but we gained that in utility," Norton says.

The extra expense came in the form of new equipment that had to be deployed to let SNA traffic traverse the IP network, in addition to new routers and firewalls. And Trane's private-line net was not a fully managed service whereas the new one was.

But since the cutover, the cost has been offset by added functionality. "In the last three years we have gotten more on the level of connectivity, security and service and haven't paid more," he says.

For example, ANS now offers data compression. "Since ANS turned on compression, we are actually getting 70K to 80K bit/sec on our [dedicated] 56K [Internet] connections," he says. "Now that's more bang for the buck."

This once all-IBM shop has been migrating applications to a client/server environment for the past four years. The client/server piece of the equation is still a work in progress, but all traffic sent over its network today is IP, not SNA, he says.

The security question

Although security often is cited as a reason why people won't use the Internet for mission-critical traffic, Trane has "absolutely no problems with sending encrypted traffic over the Internet," Norton says. Why? Because Trane is using firewalls with 56-bit key encryption from ANS.

In fact, Trane is opening its network to business partners. "We can let some people in by using an application proxy server that requires an ID and password," Norton says. But the company is looking for a more secure way of creating an extranet.

Norton says Trane might be able to use an ANS-managed firewall capable of recognizing three domains: public, private and extranet. It would be like letting some people in the front door but not into the living room.

And Trane has more Internet plans up its sleeve. "We want to use the Internet to support 300 independent wholesale vendors," Norton says. This industry group would use the Internet to buy, sell and access key information.

But in this case, security is holding the group back. "We are waiting for the Enterprise Security Alliance to come up with a standard way of supporting security from the desktop to the backbone," he says. This is an ad hoc Internet Engineering Task Force group that is hashing out which security methods all vendors and merchants should use, such as digital certificates, secure electronic transfers, Secure Sockets Layer or Kerberos.

The automotive industry is going through some of the same motions, but on a greater scale (see story, page 68).

Still doing the migration dance

The Internet is not the answer for all users. Some SNA shops are still crunching the numbers on an earlier migration: private lines to frame relay. As a result, Internet transport links are still off in the future.

MARK ESCHER

"KNOW WHAT YOU'RE GETTING INTO AND KNOW WHAT YOU WANT TO DO. A LOT OF COMPANIES GO OUT AND SAY THEY NEED AN INTRANET, BUT DON'T HAVE SPECIFIC OBJECTIVES. BE SPECIFIC."

Glenn Botkin, information systems engineer for the advanced information technology division, Galaxy

For example, the Richmond, Va.-based investment brokerage firm Wheat First Butcher Singer, Inc. has a project under way called Branch Automation II that involves moving its mission-critical customer-account and transaction data onto its year-old AT&T frame relay net.

Wheat First is still in the evolution of private-line to fast-packet networks. So the frame relay net to 127 operating locations hasn't yet totally displaced the leased-line network.

That doesn't mean data communications operations manager Roger Hall is ignoring the Internet. To the contrary, he is in the process of evaluating the growing number of tools available to measure carrier compliance with service-level agreements (SLA). Those tools range from a simple browser interface to summary reports by port and PVC to so-called intelligent DSUs/CSUs that continually probe a user's WAN to measurement throughput. He doesn't want to jump into it until he's convinced he can hold carriers to these SLAs.

While the Web dramatically reduces the cost of developing the monitoring application, the available tools don't really deliver what Hall is looking for. "I get the impression that the Web-based measurement products are after-the-fact reporting packages rather than real-time troubleshooting products," Hall says.

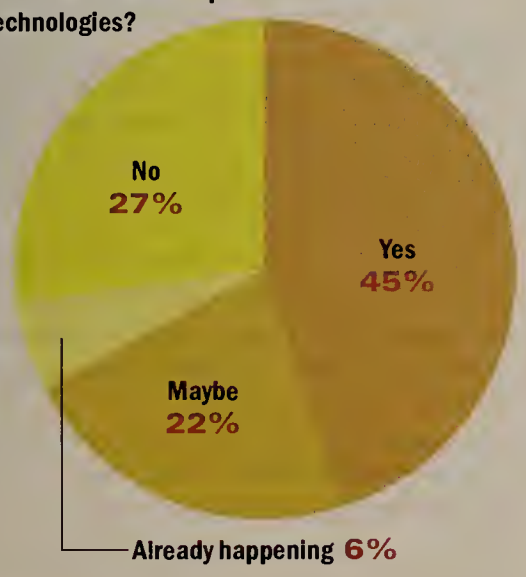
Don't really care

While few Fortune 500 shops can turn their

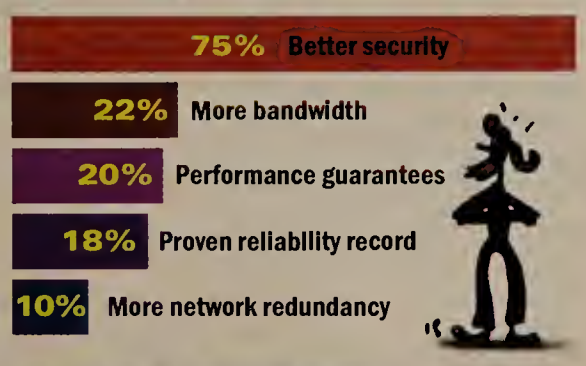
The Internet as a WAN transport alternative

A study of 51 large corporations conducted by Forrester Research, Inc., a Cambridge, Mass.-based market research firm, found the following:

Could the Internet replace other wide-area technologies?



What capabilities would the Internet need before you would use it as a WAN?*



*More than one response allowed

nose up at security, some smaller shops can get by with the minimum. Many users who have bet the bank on the Internet have put most of their security concerns on the back shelf. Why? Because they simply had little to no security before anyway.

That's the case for Galaxy Scientific Corp., an engineering and consulting firm in Egg Harbor Township, N.J.

Until just a few months ago, Galaxy did not have a cohesive way of communicating between its New Jersey headquarters and its five branch offices across the country, according to Glenn Botkin, information systems engineer for the advanced information technology division of Galaxy.

But then the CEO came knocking. Essentially, he said it was time to start doing business as a concentrated group using a single network that would make it possible to quickly and easily access information from all sites. Oh, and he wanted to keep expenses to a minimum.

At the time, Galaxy employees had to dial in to a router at the site to retrieve information, post e-mail or access the company's accounting system.

In an effort to realize the CEO's vision, Galaxy put out requests for proposal to 13 ISPs and carriers. After eliminating several based on price, the company finally decided on PSINet, Inc., of Herndon, Va., because it seemed most willing to build the network to Galaxy's terms.

One of those terms required Galaxy users to dial in through a single firewall in Atlanta. Most of the other proposals included a firewall at every site, which would cost about $20,000 each, not to mention the ongoing maintenance and management. "A firewall at each site was way too costly for us," Botkin says.

While Galaxy's single firewall approach for six sites might seem risky, it works for this engineering firm simply because it had no security before. Galaxy's other sites are protected using security filtering software on Proteon, Inc. routers.

All of Galaxy's offices are connected to PSINet via 56K bit/sec frame relay links, except for its offices in San Antonio, Texas, and San Diego, which use ISDN access. The Atlanta office is using a 256K bit/sec connection because it is home to the company's Web server and firewall.

Galaxy is saving at least $3,000 to $4,000 per month, compared with the recurring monthly service for telephone lines dedicated to each site prior to the move. "But I know there are more [savings] because there were data calls that I couldn't keep track of, like those made from hotel rooms using a calling card," Botkin says.

Comparing Internet and frame relay pricing for T-1 access ports

Maximum throughput (K bit/sec)	Cost per month: Sprint's frame relay service	UUNET's* managed extranet service	UUNET's straight Internet service
128	$2,300	$1,700	$1,295
256	$2,575	$2,350	$1,895
384	$2,890	$2,900	$2,495
512	$3,199	$3,275	$2,750
512-1,544			$3,000

*UUNET said its general pricing will be $100 to $200 higher per month when the service becomes generally available. The additional costs stem from software and hardware maintenance charges.

There also are cost savings associated with streamlining Galaxy's business operations. Prior to the Internet, electronic time sheets were faxed to Galaxy's administration office and a hard copy was sent to the administration office through the mail. Now time sheets are sent directly into the system without faxing or mailing a backup copy, Botkin adds. Before choosing PSINet's IntraNet service, Galaxy was tempted by the privacy and dependability of deploying dedicated private lines. "There were benefits to putting together a real network compared with a virtual private network," Botkin says. "If cost were the only issue, it might have been worth it, but we were looking to take as much of the burden of security and network management off of our internal operations."

And PSINet handles all of its intranet management down to protocol filtering on its routers.

Network inertia

While the Internet is not displacing traditional WAN services outright, it is certainly gaining momentum. One bank jumping on the bandwagon despite the industry's aversion to the 'Net is Charlotte, N.C.-based First Union Corp.

In February, First Union launched Web InVision, a cash management system that lets corporate treasurers obtain balance and transaction information, issue stop payments and make transfers between First Union accounts, says Jeff Morse, the bank's senior manager of information services. But users still cannot initiate a wire transfer from a First Union account to another bank.

And in virtually all industries, one factor working in favor of the Internet is the squeaky wheel syndrome.

"Some people will complain that the common pipe we provide to the Internet is too slow, so we'll raise the bandwidth just to shut them up," says Jeff Hafer, manager of telecommunications engineering for GPU Service Corp. Having thus already committed a greater portion of the IS budget to Internet access, its use is only likely to grow.

The upshot is this: There are many reasons to seriously consider complementing your existing infrastructure with Internet links. And yes, many companies are already doing it. But don't be fooled into rushing into it. The same analysis is required that any new transport medium would demand.

NEWS YOU CAN USE

Driving to the edge

ANX will set the pace for change in the automotive industry.

The automotive world is in the process of creating what will be the largest extranet, allowing car and truck manufacturers communicate with suppliers over the Internet.

The idea of the Automotive Network eXchange (ANX) was born almost two years ago and is backed by General Motors Corp., Chrysler Corp., Ford Motor Co. and several tier-one equipment suppliers. The network is expected to save the automotive industry millions every year, says Thomas Hoy, executive director at the Automotive Industry Action Group (AIAG), of Southfield, Mich.

Much of the savings will come from the reduction of dedicated connections between manufacturers and suppliers. Because ANX users will be able to connect to the ANX extranet through the Internet, users will only need a single dedicated connection.

The ANX, which is now being tested, is an IP-based network that will run over the Internet using services from a handful of Internet service providers, Hoy says.

Because of the Internet's soiled reputation for unreliable and unpredictable network delays and failures, the AIAG laid out very specific requirements for its network.

Before an ISP can become a certified ISP (CSP), it will have to meet stringent network criteria unlike any in the world of Internet services today. The details of the requirements, which range from file transfer delays to help desk availability, are detailed in the AIAG's ANX Release 1 Draft Document Publication made available in June.

Here is a sample of the guarantees CSPs will have to support before they can get Bellcore the company overseeing the network to give them the ANX seal of approval:

- Greater than 50% of raw bandwidth throughput, which varies depending on the type of connection (ATM, frame relay, private line, etc.)
- Fewer than three packets lost for every 10,000 transmitted
- Delays of fewer than 125msec between CSP networks, network edge to network edge

Security also plays a key role in the success of the ANX. The AIAG will use security products based on the Internet Engineering Task Force's IP Security protocol, which will let users securely send and receive information over the Internet.

According to representatives from MCI Communications Corp. and Ameritech Corp., two companies that are striving to become ANX-certified, the ANX is expected to be used as a blueprint for other industrywide groups that want to link over the Internet.

— Denise Pappalardo

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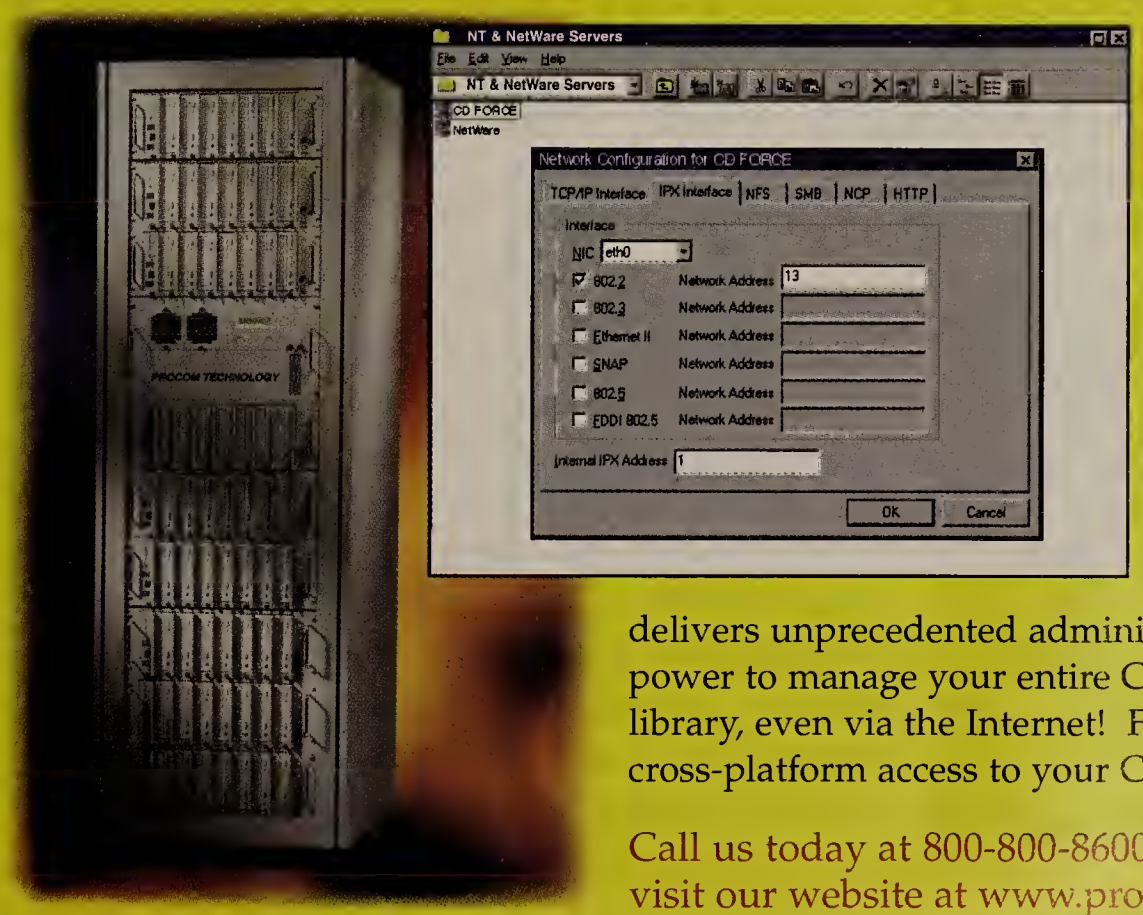

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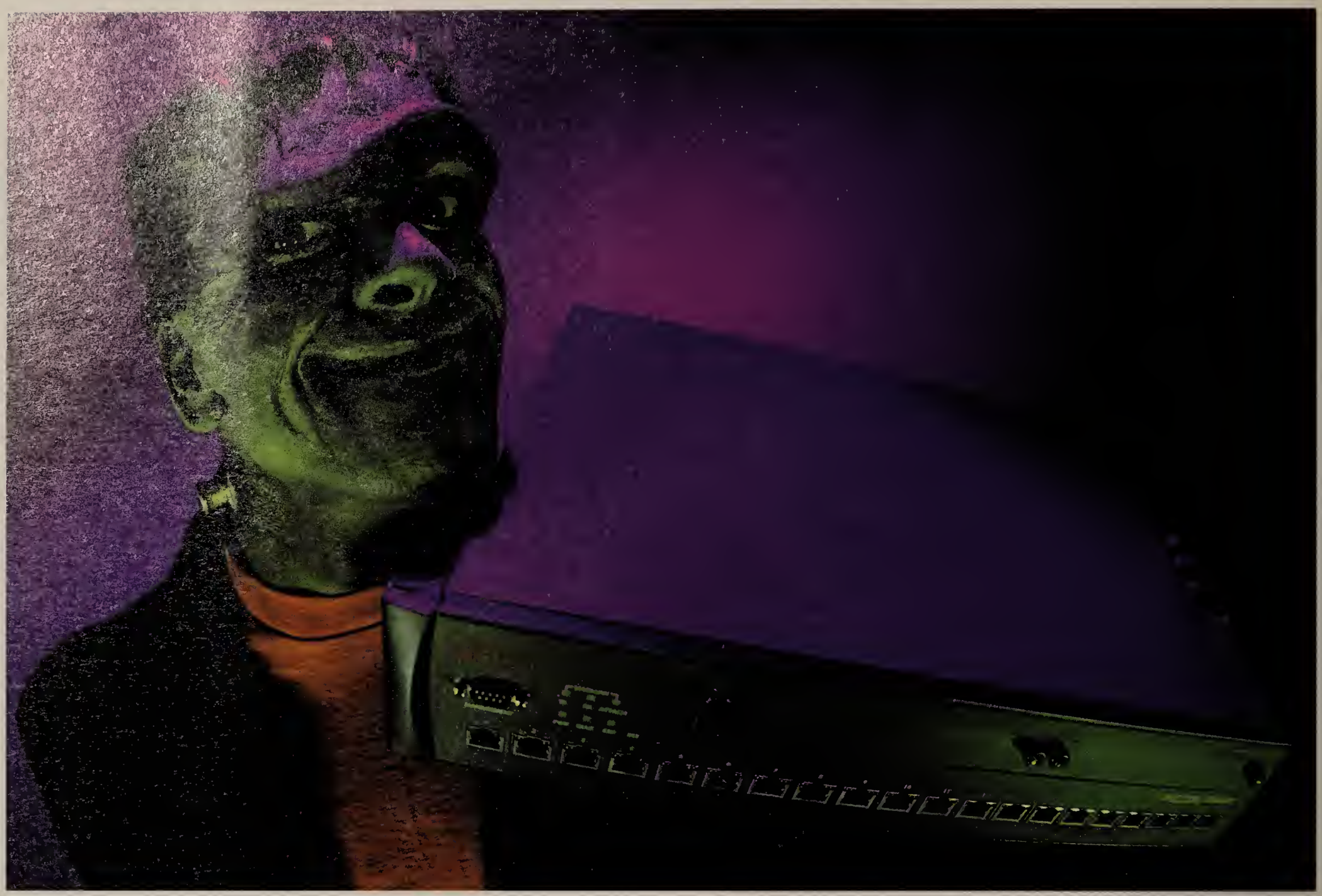

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NT devours New York!

NT may get all the headlines, but it isn't ready to take over the world just yet.

BY CHRISTINE BURNS

Microsoft rarely gets it right the first time, and sometimes not even the second. Windows NT is no exception. The first release, NT 3.1, and its 3.5 follow-up version were widely dubbed unreliable, unmanageable resource gluttons.

However, the NT 4.0 release that hit the streets just about a year ago has been deemed somewhat more stable and much easier to use.

But it still is not perfect. In fact, it is filled with significant gaps — gaps Microsoft Corp. promises to fill with Windows NT 5.0. That's why *Network World* interviewed users that have been through the NT wringer. The result is our Top 10 list of NT enterprise gaps and how you can fill them.

No. 1: Implementing NT domains

While Microsoft's Active Directory is coming down the pike with NT 5.0, it's not here yet. This directory gap leaves anyone looking to install NT 4.0 with the dubious task of setting up NT domains. Domains are logical groups of NT servers and users corralled together for administrative purposes.

Your choice is to set up one master domain in which all user access rights are administered from one point or a multiple domain design in accordance with corporate structure. But under the second scenario, for a user in the sales domain to use a printer in the marketing department, you must establish a trust relationship between the two domains.

While there is no workaround tactic for NT domains, short of a third-party directory, users across the board agree the best tool for managing them is plenty of advanced planning. And the key to an adequate domain design is a strong focus on how you want to handle user administration, as opposed to how your corporation is organizationally broken down.

Rand Morimoto, owner of Inacom Information Systems, Inc., a network integration firm in Oakland, Calif., recommends a single-domain model for more than of 80% of perspective NT deployments.

For performance reasons, Microsoft has set an upper limit of 40,000 for the number of objects that can reside in one domain. But Morimoto says several third-party tools can help users gauge whether they can balance centralized control with adequate network performance.

Morimoto recommends Digital Equipment Corp.'s Capacity Planner for Windows, which helps administrators determine how many servers and how much bandwidth will be required to support specified applications. Additionally, BlueCurve, Inc.'s Dynameasure lets a network manager measure how NT networks handle workload by applying controlled, application-level stress and reporting performance as average response time and throughput.

No. 2: Granular admin rights

The downside of implementing a single-domain NT network is that it only allows all-or-nothing user account control. This means there is no way to delegate limited administrative tasks to lower level network managers without granting them full administrative rights.

"The security holes this opens up are huge," says Kurt Guerrero, senior network analyst with Northern Trust Corp. in Chicago.

Northern Trust currently is migrating from 48 NetWare 3.1 servers to 16 NT servers. Guerrero has set up a master domain for administering all 7,000 user accounts and access rights.

To get this administrative granularity, Guerrero turned to Trusted Enterprise Manager (TEM), a new product shipped by Master Design and Development, Inc., of San Ramon, Calif.

TEM gives customers 20 different levels of administration functions or rights. Customers can group different administrative levels into a template that can be reused across the enterprise by different administrative groups.

Mission Critical Software, Inc., of Houston, offers a similar product called Enterprise Administrator, which creates subclasses of administrators.

No. 3: NetWare cohabitation

Because NT is making headway into networks traditionally dominated by Novell, Inc.'s NetWare, interoperability becomes an issue. Both Novell and Microsoft have been successful in offering services that let NetWare users access NT resources and vice versa. However, there is no innate synchronization between NT domain user accounts and Novell user accounts as they are defined in Novell Directory Services (NDS).

"You end up managing two sets of user accounts, which is a waste of time," says Bruce Bancroft, vice president of operations at Trellis Network Services, a systems integration firm based in Princeton, N.J.

While NT will not be offering any synchronization of user information until it ships its Active Directory technology, Novell and another Utah-based company, NetVision, Inc., already deliver products that do:

- The Novell Administrator for Windows NT

NT SERVER GAPS

NEWS YOU CAN USE

Top 10 reasons why users think NT 4.0 is difficult to deploy:

10. Good NT administrators and hard to find and keep.
9. Security is an issue.
8. NT's stability is limited.
7. NT has scalability limitations.
6. Applications are hard to manage.
5. NT lacks remote control options.
4. Distributed NT servers are hard to handle.
3. NT/NetWare interoperability is limited.
2. Delegated authority is not possible with NT.
1. Domains are difficult to manage.

— a snap-in to the NDS NWAdmin management interface — lets network managers pull NT Server user accounts from multiple domains into a common NDS database.

• NetVision's Synchronicity for NT, which has been on the market longer than Novell's product, achieves the same end.

No. 4: Getting a handle on distributed NT servers

For Rick Shope, manager of PC technology at NationsBanc-CRT in Chicago, the biggest problem is physically managing distributed NT machines.

NationsBanc-CRT, historically a big Unix shop, ported a set of tools to fill this NT gap. The tools, currently used to manage its distributed Hewlett-Packard Co. HP-UX boxes, comprise a set of agents that sit on all of the NT boxes to monitor performance and overall system health.

A third-party product that renders a similar service in an NT-only network is ManageX from NuView, Inc. This is an object-oriented application that captures real-time performance data from any NT machine on the network. It also enables administrators to track computer availability.

No. 5: Remote control of NT

Another sticky point in administering distributed NT servers is their limited remote management capabilities.

NT includes several tools that let an administrator monitor single NT machines via a Web browser or alter those utilities from another NT management console. However, there is no integrated capability that allows complete remote control of a remote NT machine.

One of the first things Mike Todd, a principal with Northwind Consulting in Kirkland, Wash., advises NT customers to do is purchase Symantec Corp.'s pcAnywhere remote control software. No matter what tools Microsoft gives you with NT, there is always something that you are going to have to do locally, Todd says.

PcAnywhere provides remote control connectivity that mirrors an NT server console on a remote computer.

No. 6: Managing multiple NT apps

Trellis' Bancroft says the driving force behind most of the NT installations his firm handles is BackOffice applications.

"Trying to keep these apps up and running on top of the management issues of NT can be daunting," Bancroft says.

One third-party product that addresses these issues directly is NetIQ Corp.'s AppManager, a suite of tools used for centrally administering all of the BackOffice components.

Jim Milbery, principal of the Milbery Consulting Group in Philadelphia, recommends AppManager over some of the larger systems management platforms from Computer Associates International, Inc. or IBM subsidiary Tivoli Systems, Inc. "NetIQ is optimized for NT. The high-end stuff does a lot more, but they don't do such a great job at those NT-based lower end details," Milbery says.

No. 7: Scalability limits

Despite a concerted effort by Microsoft to convince the industry that the future of NT is in the scalable enterprise tool, users still are looking for ways to make NT support their largest applications.

Milbery said most manufacturing firms he works with will not run production applications on NT if the workload requires more than 32 consecutive connections.

However, some firms do want to run an application that is only available on NT. In that case, Milbery will install several front-end NT servers to run the application, but any heavy-duty data processing still will be done by a back-end Unix box.

No. 8: Stability

Hand-in-hand with the issue of scalability comes the question of reliability. While most users say NT 4.0 is a dramatic improvement over its ever-crashing predecessor, they still don't trust NT for 24x7 applications.

"We have to reboot our customers' NT machines twice a month, whether it's bugs or memory leaks or what. The systems get frozen, and you can't bring them back up without further interrupting your applications," Todd says.

One way to get fault tolerance for NT 4.0 systems is to use one of several products that tie two NT nodes together with software and a high-speed link. If one node goes down, the other picks up the operations of the failed machine.

Two software-based failover products that can be deployed on existing NT servers are Network Integrity, Inc.'s LANtegrity and Vinca Corp.'s Standby Server for NT. Digital and Compaq Computer Corp. offer NT 4.0-based hard-ware/software failover packages, as well.

No. 9: Security woes

"Every week I read about yet another student hacking into NT. That doesn't give me a lot of confidence to expose the servers we have," says Fred Towery, a network instructor at San Jacinto College in Houston.

Towery says the university does not expose any of its 50 NT servers to the Internet. Instead, he currently is testing Novell's BorderManager suite of virtual private networking, proxy caching and packet-filtering tools.

Microsoft does ship auditing tools with NT 4.0 and offers several more in the NT 4.0 resource kit that are supposed to allow a network administrator to pinpoint any security breach.

"But they are hard to deploy and use, and they result in a huge amount of overhead on the servers," according to Phil Sointo, a senior engineer with Alpine Computer Systems, Inc., of Holliston, Mass.

Northern Trust's Guerrero says he bypassed the NT auditing tools in favor of Bindview Development Corp.'s Enterprise Management System (EMS). EMS provides security reports and analysis for NetWare and NT machines and lets an administrator set security parameters across systems from one console.

No. 10: Trained personnel

You can't keep a good NT manager down. That is the final problem users identified with having their business run NT.

Seeing as NT has only been on the market for five years, finding administrators with a lot of experience in managing NT servers and security is going to cost significant money these days, Milbery says.

The only workaround Milbery recommends is spending the cash on good salaries up front, because repairing the damage an inexperienced NT administrator could wreak on your network could be more expensive in the long run.

The NT trend at NationsBanc-CRT

The Windows NT thrust at NationsBanc-CRT in Chicago started at the desktop and spread out from there.

When the bank started putting NT 3.5 Workstation on its 800 desktops 3 1/2 years ago, the goal was office automation, says Rick Shope, manager of PC planning and technology. Shope anticipated running spreadsheets, personal databases and e-mail access on the 32-bit PCs. On most traders' desks, the NT machines worked side by side with Unix workstations that tapped into all the heavy-duty financial applications running on Unix servers.

While no traders have discarded their desktop Unix boxes outright, Shope says many are now beginning to use NT for tasks previously handled by Unix. For example, some traders are running X Windows on their NT machines, allowing them to access Unix server-based trading information.

To provide file and print services for the NT desktop machines, NationsBanc-CRT was forced to install 50 NT Server boxes. Shope says at the time Novell, Inc. had not addressed NT/NetWare integration issues. Shope has since expanded the role of NT Server to provide SNA connectivity to its mainframe. The company also is developing Web access based on a mix of NT and Unix boxes.

In the past NationsBanc-CRT has used NT Server's built-in remote access capabilities for letting users dial in to the network. It now is moving toward a more secure, smart card-based system. The company has no plans to use NT's low-end routing technology to help connect its subnets.

And there is no move afoot to expand the NT role to replace the 60 Hewlett-Packard Co. Unix servers in the network.

"We built our calculation engines and our SQL databases on Unix from Day 1. They work. Traders can get to them. Why go through the hassle of moving all of that data if it's unnecesary," Shope says.

Rick Shope, manager of PC planning and technology

DAVID J

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Speed 101

Where and when to use ATM, Gigabit Ethernet and Layer 3 switching.

FAST LANS

BY JODI DANIELS

Your user population is exploding. You're deploying a corporate intranet chock-full of Web browser technology. Java is taking hold of your network, and applets are everywhere.

There's no denying your network is in need of a bandwidth boost.

But deciding which high-speed LAN technology to migrate to is no easy task. For a while ATM seemed like the obvious choice, but now Gigabit Ethernet is all the rage. And where does Layer 3 switching fit into the mix?

These are the high-speed LAN switching technologies that are all the buzz. The key to figuring out where they can fit into your network plan is understanding the roles to which each is best suited and where they can play together.

Assessing ATM

Most industry observers agree you should only look at ATM in the LAN if you've got a need for:

- Quality-of-service (QoS) capabilities
- Integrated voice, video and data traffic
- A single technology that bridges the LAN and WAN

If you don't see yourself in that picture, don't be surprised. Thomas Nolle, president of CIMI Corp., a consultancy in Voorhees, N.J., says only 30% of all organizations fit the ATM profile.

The technology's strength, most analysts agree, is in handling multimedia traffic that requires QoS capabilities. QoS enables ATM switches to "point bandwidth to the applications that need it for as long as they need it," says Skip MacAskill, an analyst with consultancy Gartner Group, Inc., in Stamford, Conn.

For example, a financial firm on Wall Street may want its employees to have a stock ticker running across the bottom of their computer screens, a live video feed from CNN in the top corner and a basic word processing application all running simultaneously. In such a case, ATM fits the bill. ATM also is good for users who require isochronicity — or the ability to handle time-sensitive data, Nolle says. He notes these are highly specialized applications that most desktops won't be employing.

One of the original selling points of ATM was that it amounts to a single technology that spans LANs and WANs. That vision has not become a reality for many users, so if this is your only reason for evaluating ATM, you might want to hold off. In fact, with technologies such as IP over Synchronous Optical Network (SONET) in the offing, it may soon be possible to use IP to bridge the LAN and WAN worlds.

Organizations with explosive growth rates can make the case for ATM because of the technology's seemingly limitless scalability. "You can have 155M ATM downlinks, a primary ATM backbone link running at 622M, and even look at 2.4G bit/sec after that," says Patrick Limpach, a network services engineer at Case Western Reserve University in Cleveland, who is a FORE Systems, Inc. ATM switch user. Limpach isn't using these kinds of speeds yet, but likes the fact he can keep his options open.

Industry observers also point out that ATM is a mature technology with standards in place and products shipping.

"ATM gets the nod for manageability, interoperability and availability," says John Morency, principal at The Registry, Inc., a Newton, Mass.-based consultancy.

But it also has been known to be quite complex. In fact, many industry observers complain about difficulties deploying the cell-based technology and integrating it with an existing packet-based environment.

JEFF BURKHOLDER

"IF INTEROPERABILITY WERE A PROBLEM WITH GIGABIT ETHERNET, WE WOULD HAVE DEFINITELY KNOWN ABOUT IT BY NOW."

George Hall, president, Internet Network Technologies

Shopping advice

Still, if you decide ATM is a good match for your network, you'll want to ensure that the switch you buy supports a variety of key features.

First, the switch's backplane should scale from 2.5G to at least 5G, but more preferably 10G bit/sec, MacAskill says. And the switch should be able to support a range of network interfaces, including 155M and 622M bit/sec ATM ports.

You also should find out whether the ATM switch will accommodate emerging standards such as the Private Network-to-Network Interface, which enables you to link ATM nets together. Assuming you'll keep some legacy LANs around, you'll want to make sure the switch can be upgraded to support LAN Emulation (LANE) 2.0 for transporting native LAN traffic over ATM, and User-to-Network Interface 4.0, which is the signaling necessary for LANE to function.

"Many of those standards may require significant firmware upgrades or even a complete swap-out of a switch, so clients need to know what generation ATM switch the vendor is offering," MacAskill says.

You'll also want to understand how the ATM switch handles Layer 3 services. Does the box support Multi-Protocol over ATM (MPOA), giving it routing capability, or do you have to attach a stand-alone router? MPOA can perform the routing task without requiring the deployment of a separate, expensive router. However, MPOA was only recently standardized, and compliant products will not be in full force until year-end.

Other key features to put on your shopping list include SNMP and Remote Monitoring (RMON) network management capabilities, Limpach says.

Less critical — but nice-to-have — ATM switch features include support for a large number of

emulated LANs, port mirroring, traffic shaping features, multicast handling, early and partial packet discard capabilities and buffers that can handle at least 8,000 cells, analysts say.

As far as features you shouldn't waste time worrying about, Limpach says he'd skip Web-based management. "HTML-based management may be hot right now, but I don't want to waste CPU cycles on the switches to do all the HTML code when [command-line] SNMP is simple and efficient."

Guide to Gigabit

If the motto, "Keep it simple, stupid," suits you, Gigabit Ethernet may be up your alley, for simplicity is at the heart of its appeal.

You're a candidate for Gigabit Ethernet if you:

▲ Already have a significant investment in Ethernet technology

▲ Need some capacity headroom

▲ Have a fixed support staff and would like to limit implementation complexity

"If you're looking to play a bits-for-bucks game by building a network that is compatible with your existing infrastructure but much higher in capacity, Gigabit Ethernet is probably for you," Nolle says.

Pricing of Gigabit Ethernet gear ranges from $3,000 to $3,500 per switch port, and the adapter cards cost about $2,000. By contrast, lower capacity 622M bit/sec ATM switch ports cost about $3,500, and the adapters are about $3,000. And Gigabit Ethernet prices are expected to drop rapidly as shipments ramp up.

The ideal role for the technology — a role Nolle estimates is applicable to 70% of large organizations — is tying together Fast Ethernet switches that, in turn, support 100M bit/sec links to servers and switched 10M bit/sec connections to desktops.

George Hall, president of Internet Network Technologies, Inc., an Internet service provider based in Sacramento, Calif., says he wanted to improve network throughput without disrupting the switched Ethernet and Fast Ethernet architecture already in place. "We wanted to grow seamlessly within our 802.3 environment, and Gigabit Ethernet let us do that," he says.

Customers should be aware, however, of new cabling and distance limitations that go along with Gigabit Ethernet, analysts say.

Gigabit gear

When it comes to buying a Gigabit Ethernet switch, you've first got to nail down product delivery schedules from vendors, which include start-ups such as Alteon Networks, Inc., Extreme Networks, Inc., Foundry Networks, Inc., Packet Engines, Inc. and Prominet Corp., as well as larger, established players such as 3Com Corp., Bay Networks, Inc., Cabletron Systems, Inc. and Cisco Systems, Inc.

From a technical standpoint, the first thing to look for is a switch that supports wire-speed throughput for all interfaces, with adequate backplane capacity to support fully loaded ports.

Some switches — such as Alteon's AceSwitch 110 — can easily become oversubscribed. This switch supports eight 10M/100M bit/sec ports and two Gigabit Ethernet ports but has a backplane capacity of only 2.5G bit/sec. "That basically takes up all the capacity of the box right there with just the two gig links," says Gigabit Ethernet user Steve Lewis, a network administrator at DynCorp., in Fairfax, Va.

You also should determine how the network scales with a large number of switches, according to Jaimin Patel, a manager in the infrastructure business unit at Predictive Systems, Inc., a consulting firm based in New York.

"Buyers need to ask a whole host of questions," Patel says. "In a large switch design, are redundant paths between switches allowed? Can load balancing be taken advantage of with multiple switch connections between switches? How do you interconnect multiple pockets of gigabit networks across a campus?"

You also may want to add Layer 3 switching capabilities to your shopping list. "A lot of the high-end Gigabit Ethernet switches come prepackaged with Layer 3 services, so you can kill two birds with one stone," MacAskill says.

Vendors such as Rapid City Communications (which was acquired by Bay), Extreme and Foundry all offer wire-speed switching and routing on every port. But some players — such as Prominet — do not yet offer integrated Layer 3 capabilities.

Of course, you'll also want to look at switch basics such as virtual LAN support, media access control address limitations, port-mirroring features and multicast functionality. And it's important to evaluate whether the switch provides a growth path toward an ATM backbone if you anticipate mixing the two technologies down the road.

What about QoS capabilities and Resource Reservation Protocol (RSVP) support for Gigabit Ethernet switches? It's too early to worry about those features now, industry observers say.

"RSVP does nothing but let you request bandwidth; there's no guarantee that the network can even meet the request or that the network will respond or acknowledge that request," MacAskill says. And standards that would address that problem are a long time coming. The Internet Engineering Task Force is trying to map those RSVP requests into ATM's QoS structure, which will allow users to combine their frame- and cell-based networks and deliver a consistent class of service. "But that's a long way out," he says. That's why ATM gets the nod if you need QoS now.

On the negative side, the Gigabit Ethernet standard will not be finalized until early next year, so you'll have to chance interoperability until the standard is set or simply go with a single vendor. At any rate, ask vendors whether their switches can be upgraded to support the final standard.

Layering on Layer 3

Whether you decide to go with ATM or Gigabit Ethernet, you also may find a need for Layer 3 switches. These devices perform routing functions on the first packet of a conversation, then switch the rest, resulting in speedier data delivery vs. traditional routers.

"Layer 3 switching is like having your cake and eating it, too," Morency says. "You get the functionality of Layer 3 routing services, but the effective performance of Layer 2 capability."

You'll want to deploy Layer 3 switching if:

▲ You already have a highly structured IP address environment with subnets established.

▲ Your subnets are generally large enough that switches can be deployed within a subnet without crossing subnet boundaries.

▲ Communication between subnets needs to

NEWS YOU CAN USE

Stacking up the options

ATM

Pros:
- ▲ Highly scalable
- ▲ Able to run data, voice and video traffic
- ▲ Offers quality-of-service capabilities
- ▲ Industry standards are set

Cons:
- ▼ Sharp learning curve
- ▼ Incompatible with existing gear
- ▼ Weak net management tools

Pricing: About $750 per 155M switch port; $3,500 per 622M bit/sec port

Availability: Now

Gigabit Ethernet

Pros:
- ▲ Familiar technology
- ▲ Backward compatible with existing gear

Cons:
- ▼ No standard yet; Interoperabilty is uncertain
- ▼ Lack of net management tools
- ▼ Currently limited to data traffic
- ▼ Scalability is uncertain

Pricing: Ranges from $2,500 to $3,500 per switch port

Availability: Some products shipping now; most products will be available by year-end

Layer 3 switch

Pros:
- ▲ Combines benefits of switching and routing, eliminating need for expensive routers
- ▲ Can be used with various underlying switching technologies

Cons:
- ▼ Most products are proprietary
- ▼ Many only support IP environments

Pricing: Ranges from approximately $800 to $1,200 per switch port

Availability: Some products shipping now; most will be available by year-end

SHAWN HENRY

be expedited.

Put another way, if you don't want to further segment your network by adding router ports, or if you want to shuttle traffic between VLANs without using a router, consider Layer 3 switching. In fact, Gartner Group estimates that by the end of 1998, Layer 3 switches will displace about 60% of the standalone routers currently being used for LAN segmentation.

In the ATM world, Layer 3 switching is accomplished using the MPOA standard. In the frame-based Ethernet arena, however, Layer 3 switching is much more proprietary. For example, 3Com has its Fast IP approach, Cabletron offers its SecureFast Virtual Networking, Cisco will unveil its NetFlow devices and Ipsilon Networks, Inc. kicked off the whole Layer 3 switching craze with its IP switching scheme.

When evaluating any vendor's Layer 3 switch, you'll naturally want to look at basics such as performance, scalability and network management capabilities, but you also should look under the covers at the underlying routing technology. Find out if it's based on true routing code and what protocol is being used to exchange data with other Layer 3 switches. If it's standards-based, such as Open Shortest Path First and Routing Information Protocol, it opens up the possibility of multivendor networks.

For example, Cabletron provides "virtual routing" with its SecureFast Virtual Networking devices, which analysts say isn't real, standards-based routing. Xylan Corp., however, collapses a basic routing stack into the switch, which is less proprietary. This is an important issue, given that most users have multivendor environments, meaning it's likely that Layer 3 switches will need to talk to routers from different vendors.

You'll also need to know whether the switch routes protocols such as IPX and AppleTalk.

"A lot of the switches out there seem to assume that everyone has only one protocol stack, but we're nowhere near an all-IP environment," Limpach says.

Nolle, however, says IP-only should be the goal. "If you are going to go to Layer 3 switches, you had better be prepared to get out of everything but IP," he says.

Keep in mind that no one technology — ATM, Gigabit Ethernet or Layer 3 switching — is likely to solve all of your high-speed LAN needs. You'll probably find multiple technologies will have to coexist.

DynCorp.'s Lewis is counting on that. "We like to picture our infrastructure as a broken wagon wheel," he says. "Some slices will need ATM for different kinds of multimedia like still video and short-term imagery. Some users, however, will need even higher speeds of multimedia along with high-speed data that won't tax the rest of the network, which is where Gigabit Ethernet comes in."

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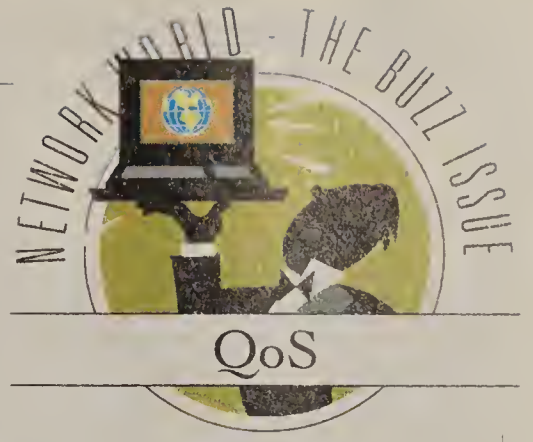


It's Quality of Service, stupid!

QoS sounds great, but it may not be what it appears.

BY TODD WALLACK

Quality of service (QoS) — not more bandwidth — is the only way to ease network congestion, declared Northern Telecom, Inc. Chief Operating Officer John Roth.

Speaking at NetWorld+Interop 97 in May, Roth warned that data traffic is surging across public networks at mind-boggling rates, and carriers can't keep up.

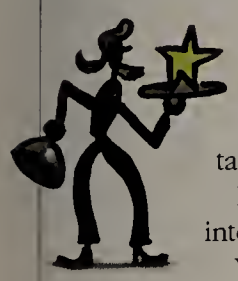
"The current approach to network design is not going to cut it," Roth said. "These networks are not capable of supporting 100% growth in traffic year on year."

So Roth pitched a seemingly simple solution: QoS, or the ability to allocate resources to the customers who need it most.

If you've got a real-time videoconference, for example, you could earmark the necessary bandwidth for those packets, while less critical data — say PointCast updates — could wait.

The only problem: Hardly any users are implementing true QoS technology.

"Most people are concerned about quality-of-service issues like they are concerned about global warming," says Tom Nolle, president of CIMI Corp., a consulting company in Voorhees, N.J. Lots of people talk about it, but rarely take action.



It's not that network managers aren't interested.

With corporate networks clogged with everything from Web page requests to multimedia, users would love to be able to guarantee bandwidth to the end users who really need it. And vendors are jumping on the bandwagon, pitching QoS features for everything from ATM to Gigabit Ethernet.

But Nolle argues the technology is simply too premature to factor into buying decisions.

"You really won't be able to make any intelligent decisions in the QoS [market] until the end of 1998," Nolle says.

To be sure, experts can point to a handful of users trying QoS services internally. But they're typically using limited features in specialized applications over a small piece of their networks.

Take Greg Britz, systems integration engineer at Burlington Northern Santa Fe Corp. Britz says he didn't have much trouble configuring his General DataComm, Inc. equipment to guarantee bandwidth for voice traffic over his ATM WAN. Frame relay and IP traffic have less priority.

"It really becomes a benefit as you load up the system," Britz says.

But Britz wouldn't think of trying to implement QoS at the desktop. It's easier to add more bandwidth. And he's just beginning to talk to Internet service providers and carriers about extending QoS features beyond the corporate network.

"They say they have [the services]," Britz says. "But they're probably just implementing [QoS] in its simplest form."

ISPs are cautious

Indeed, MCI Communications Corp. officials aren't expecting much demand for QoS services until late this year or early next year.

"You hear about it from the press, but I think it's still very early," says Robert Hagens, MCI's director of Internet engineering. "We are still in the process of defining what our services should be."

Hagens also says users should be skeptical of vendors pitching QoS services this early on. "If you're an IP manager with responsibility to deliver mission-critical data, you need to analyze very carefully how a prospective vendor claims to be offering QoS," he says.

Meanwhile, some users have run into trouble extending QoS technology to the desktop.

Consider the plight of Linda Winkler, manager of advanced networking at Argonne National Laboratory in Argonne, Ill.

Winkler has been trying to serve some demanding end users who are working with scientific applications that require as many as seven simultaneous datastreams. The challenge is trying to keep all the streams in sync in a dynamic network.

Even though Argonne has an extensive ATM network with built-in QoS features, Winkler has had a tough time finding network management tools and applications to make it work.

"[QoS] sounds great, but it's pretty far off in the future," Winkler says.

Winkler's problem is particularly acute because her network features equipment from so many different vendors.

According to John Bass, lead engineer for MCNC's VITALNet, a network testing lab in Research Triangle Park, N.C., few QoS interoperability tests can match the rigor of Argonne's real-world environment.

The many meanings of QoS

Purists say quality of service means dynamically guaranteeing bandwidth for different applications or data traffic, depending on the need. But vendors, eager to latch onto a hot buzzword, have applied other meanings to the term, such as:

- **Prioritization: Giving traffic different levels of priority, but not guaranteeing any bandwidth.**
- **Permanent or switched virtual circuits: Setting up a network to deliver a fixed amount of bandwidth between two points, almost as though there was a dedicated physical cable in place.**
- **Service guarantees: Internet service providers promising to provide a certain level of overall bandwidth or uptime.**

"Most of the time when we do a [QoS] test for a client, it's with one or possibly two vendors' equipment. It's not five," Bass says.

Of course, vendors say the hardware works just fine. Software developers and users just need to take advantage of it.

"The switches are capable," says Nortel's Brian Vezza.

Plenty of vendors also point out that Microsoft Corp.'s WinSock 2, a Windows network API, supports QoS. But Nolle says there aren't any programs written to take advantage of it, making it a moot point.

So how long before QoS becomes common?

3Com Vice President Jeff Thermond says it's easy to set up a fixed bandwidth level between two points — for example, a pair of video servers — in a network. But guaranteeing varying levels of bandwidth to workstations could take years.

Still, vendors will eagerly claim the QoS mantle with a whole raft of more limited features. That includes everything from prioritizing traffic to setting up permanent virtual circuits.

DAVID SUTTON

> "[QOS] IS IN ITS VERY EARLY STAGE. EVERYBODY CLAIMS THEY WANT QOS . . . BUT [THEY] CAN'T BUY IT."
>
> *Linda Winkler, manager of advanced networking, Argonne National Laboratory*

Even more confusing, ISPs often label general service guarantees as QoS.

3Com argues plenty of users are quietly using QoS, even though it knows of only a handful. Pouring over sales figures, Thermond says too many customers are buying high-end equipment with QoS built in to be ignoring the features.

"This is a major buying influence," he says.

Eventually, experts predict, multimedia and transaction applications will drive QoS demand. Currently, most users have to segregate the traffic. Mixing it all together, however, could be less expensive.

Does QoS mean ATM?

Which brings up another question. If you want QoS, do you need ATM?

George Dobrowski, president of the ATM Forum, brags that built-in QoS features set ATM apart from frame relay, Gigabit Ethernet and other technologies.

"With ATM, quality of service exists right now," he says. "It's one of the biggest advantages that ATM provides."

But critics say the QoS features are so complex, few users actually implement them.

"We're not really seeing the advantage of ATM," Winkler says. And ATM is no longer the only option.

Gigabit Ethernet vendors are proposing what Dobrowski calls a brute-force method to QoS. Extreme Networks, Inc., for instance, is selling switches that let network managers allocate a certain range of bandwidth to different classes of users.

George Prodan, Extreme's marketing vice president, argues that though not as sophisticated as ATM's features, the method is easy to implement and puts network managers firmly in control of their resources. "This is a good first step," he says.

Obstacles to QoS

- Confusion over meaning of QoS
- Complexity of ATM quality-of-service protocols
- Lack of ATM to desktop
- Non-ATM technologies are still being developed
- ISPs and carriers are still working on QoS services
- Lack of QoS-friendly applications
- Network management tools are often vendor-specific
- Few tools available to measure QoS
- Lack of interoperability testing

Frame relay jumps in

Companies also are looking at adding QoS features to frame relay.

"ATM was lucky," says Doug O'Leary, chairman of the Frame Relay Forum's Technical Committee. "They designed the QoS in from the beginning."

But O'Leary says he hopes the forum eventually can add some basic QoS features to frame relay.

"We don't want to add so much complexity to the protocol that it causes confusion in the marketplace," he says. "It's not going to be easy to retroactively implement QoS features in a frame relay network" because much of the hardware would have to be upgraded or replaced.

Meanwhile, the Internet Engineering Task Force is hammering out a protocol to use QoS over the Internet.

The Resource Reservation Protocol (RSVP) would let users make requests for extra bandwidth for special applications, such as multimedia. But there's no guarantee anyone will honor the request.

Most system administrators have little incentive to program their routers and switches to reserve extra bandwidth for outside users filing RSVP requests. And ISPs will probably demand additional fees. That could translate into big bills if end users are allowed to request extra bandwidth willy-nilly.

Vendors also say RSVP doesn't scale well and note that the negotiations with each router along the route will often take longer than a typical Web connection.

Still, RSVP may be the only option for using QoS over the public Internet. And a Princeton professor recently came up with a way to apply it to Ethernet. That could make RSVP a powerful tool for extending QoS to the desktop, where most users can't afford to use ATM.

Yet a larger challenge looms on the horizon. Even if QoS becomes widely used in ATM, frame relay, Gigabit Ethernet and the Internet, vendors still will have to find ways to tie them together so a QoS message can be passed all the way through the network.

The bottom line: QoS probably won't ease your traffic woes anytime soon.

NEWS YOU CAN USE

QoS: Where it stands

ATM: The ATM Forum approved two QoS protocols in January.
- Traffic Management available bit rate (ABR)
- Signaling ABR

Frame relay: The Frame Relay Forum has approved a class-of-service protocol for prioritization, but has not formally agreed to tackle true QoS.

Gigabit Ethernet: Extreme Networks is pushing its policy-based QoS protocol.

Internet: The Internet Engineering Task Force has several working groups focused on QoS, including Resource Reservation Protocol (RSVP). So far it has published several proposed standards:
- RSVP — Version 1 Functional Specification
- RSVP Cryptographic Authentication
- RSVP Management Information Base
- RSVP Extensions for IPSec Data Flows

And one Informational document:
- RSVP — Version 1 Applicability Statement

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Nobody's doing the local motion

Conventional wisdom says telecom reform is a failure, but that's not the whole story. Savvy net managers are in a good bargaining position with local phone companies.

BY TIM GREENE

Are you waiting for local telephone competition to lower your phone bills? Don't. Wide-open competition isn't going to happen anytime soon.

If you wait, it will be at least six months and possibly two years before competition in local markets heats up — and that will be spotty — with the biggest markets heating up first, according to Sanjay Mewada, a telecom analyst for The Yankee Group in Boston.

But in the meantime, there are lots of ways major users can squeeze better deals out of carriers.

Start taking advantage of competition that already exists, and use the threat that more is on the way to squeeze added value from your telecom dollar.

Play CAP vs. LEC

Remember, there was already competition before the telecom act was ever signed. Competitive access providers (CAP) such as MFS Communications Company, Inc. (now WorldCom) and Teleport Communications Group (TCG) have been around for years. And they are still there, along with lesser known CAPs.

They don't offer all the services that incumbent local exchange carriers (LEC) do. But CAPs do offer some of the services, such as dedicated lines to long-distance carriers, data networking and local dial tone, and your LEC doesn't want to lose that portion of your business.

CAPs, however, desperately want to pick up that part of your business. It's known as cream skimming, and that can work for you. Here's how: Identify the portion of your network's telecom service needs that a CAP regards as "cream," such as local toll calls, and let it skim some. Then let your LEC know about it. That can jar the LEC into finding better deals for you not only on the skimmed services, but also on your telco business as a whole.

That doesn't necessarily mean you will get a less expensive deal, although it could. It might mean you get more features packaged for free with an existing service.

"Sometimes it makes more sense to do that than [to] get into a down-and-dirty pricing game," Yankee's Mewada says. For example, you could ask the carrier for better service-level agreements or have it apply a blanket discount for all the service you toss in its direction, making for an overall cost reduction.

While it's good to play a CAP against an LEC, remember that CAPs also compete with each other. MFS and TCG overlap in at least the top 20 U.S. markets, giving two alternatives to the LEC for some services. The major markets also attract smaller independent carriers, meaning even more choices.

THE LOCAL LOOP

A large user can entice CAPs to pay special attention if the user owns several major buildings in a given area. Customers should leverage that, says Hank Levine, a Washington, D.C. lawyer specializing in negotiating telecom contracts for major corporations.

"For the kind of volume a large user generates, one of those CAPs will run fiber to your building," Levine says. "That will provide substantial incentive to an incumbent LEC to do a deal to cover all your traffic. They will cover your corporate location and data centers and branches even though they are not in areas on a fiber loop that TCG or MFS is in a position to provide."

In order for the strategy to work, the LEC has to think that the threat of losing some of your business is real. Not all do. So far, Ameritech Corp. doesn't seem to be shrinking from the threat of competition, according to Phil Skinner, telecommunications director at Ohio State University Medical Center in Columbus. "I don't think they feel there are viable alternatives in the area. Until they lose a big account, I don't think they're going to get the ball rolling," Skinner says.

But Levine says competition that may be coming tomorrow affects LECs today. For example, AT&T is rolling out Digital Link local phone services in California, and that could have a powerful effect on LECs elsewhere. "They know it's coming, it's going to be there, and if they don't take steps to shore up their market share, they're going to get hurt. So they will do deals," Levine says.

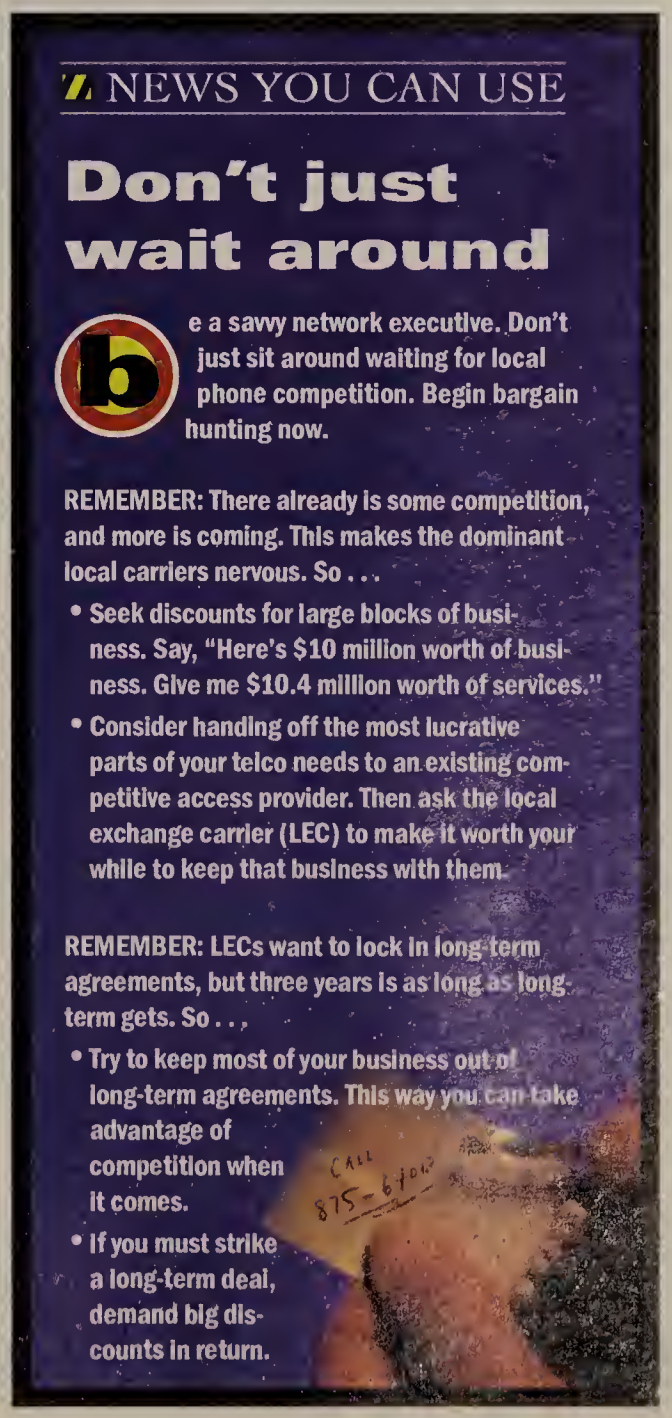

PHOTO SHAWN HENRY

Before you sit down with carriers to negotiate, carefully inventory what services you use and make tight projections of your needs for the near future, says Matthew O'Brien, past president of the Communications Managers Association.

"You can use that as part of your negotiations: 'I have x amount of minutes per month now, I expect that to grow 50% over the next 18 months.' Then you can cut a deal. The carrier has the idea that your traffic is expanding and would be more willing to accommodate a lower rate," O'Brien says.

Let them know you have more business than they are getting, he adds. Commit to giving them just half your business for two years. You may give them more, you may not. The anticipation will make them work harder — offering better deals — to get the other half.

Reserving a good chunk of your trade also will make the carrier more likely to renegotiate existing contracts if market conditions change to drive down prices, Levine says.

"You're losing your bargaining position when you start signing up 80%, 90%, 100% of your traffic to one carrier. Why would a carrier want to lower its rates when you've committed 100% of your traffic to them?" O'Brien says.

Pitfalls

There also are things to avoid, top among them being the signing of a long-term service contract that commits all or most of your business to one carrier. What is long term? "I would say anything over 12 months right now. Five years is an eternity, three years is an extremely long time," O'Brien says.

Why? "Within two years I think there will be a lot more players and a lot of the confusion and [regulatory issues] will be dealt with," he says. "You want to wait until there is a stable market before you sign five-year contracts," Mewada says.

Users should learn the lesson of the early days of long-distance competition. "The market rate was a quarter a minute, you sign a deal for 20 cents and you look like a genius — until the market goes to 15 cents and you look like an idiot. The same thing will happen in local competition," Levine says.

O'Brien says if you have a competitive LEC in your area, check it out. Make sure it has its own network and isn't just reselling someone else's services. "We had a member using AT&T locally in Chicago. They had a problem with the line. AT&T said it's an Ameritech line. Ameritech looked at it and said, 'That's an AT&T line,' " he says. When a carrier owns its own lines, it can't point fingers at someone else.

Also, he says, when you switch carriers, carry over your current service-level agreements that include penalties the carrier will pay if it fails to fulfill the agreement.

The bottom line: Don't be afraid to ask for more than you've gotten in the past. You might just get it.

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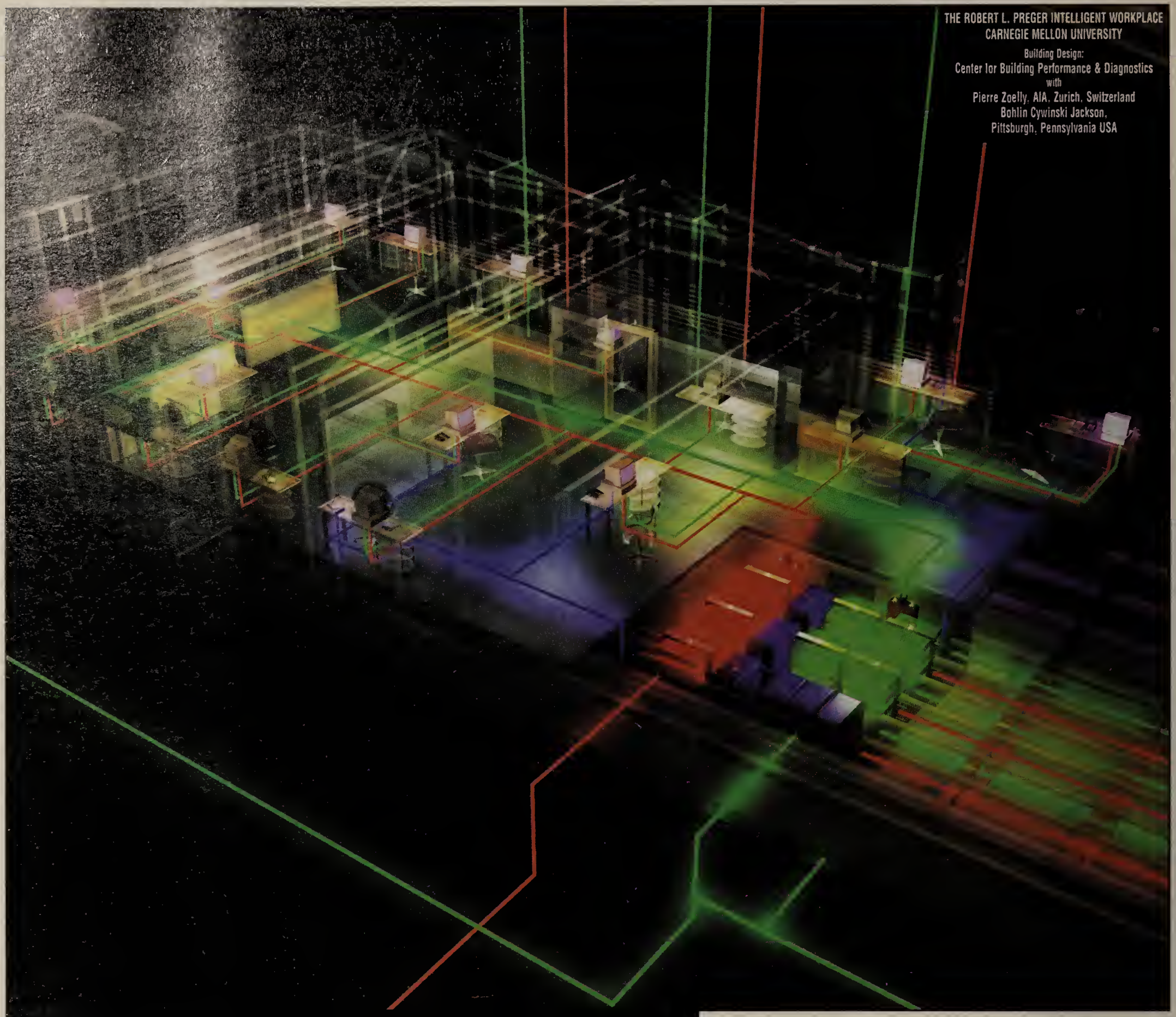

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Intra mania

Keeping your wits as you sort through Web madness.

BY PEGGY WATT

It's not enough that the Internet is stretching your networking reach and responsibility around the globe. Now you've got to contend with the crusade to build a mini-Web internally.

Don't even think about waiting out this buzz. You don't need to blow your whole budget on Web wares, but this technological trend isn't going to blow over.

Virtually all market researchers predict Internet/intranet growth through the end of the decade. International Data Corp., of Framingham, Mass., for example, places Web technology applications on top of its list of IT market growth opportunities through the year 2000, at an estimated 50% annual increase.

With so much attention focused on the Web, it's not surprising there's a lot of hogwash being passed around about intranets. So welcome to the game of lies, truths, tips and intranets. This should help you find your way through the muck.

Lie No. 1: Intranets are just LANs with PR.

This sounds like the rationale of a defensive IT manager who doesn't have an internal Web yet. Or it's something you can tell the boss if you don't want to mess with an intranet.

Yes, a LAN is at the base of an intranet. But it takes more than a LAN to make an intranet.

Can you access your LAN via a Web browser? The Web part of the LAN equation is what makes it an intranet. It's also what makes access easy for the user and why intranets are catching on.

The browser is the intuitive, universal client everyone has sought after. Give users a browser and they can search, read and download corporate data through Web interfaces to your company databases and documents with little training. It doesn't matter what client they're running — even those Macintosh nonconformists can stay in the loop. That's not your average LAN.

Lie No. 2: Intranets are just client/server technology.

There's some truth to this one: Intranets follow the client/server model but wear a Web overcoat.

"Intranet is an innovative new word for an idea that has been around for a while," says Dave Taylor, president of Intuitive Systems, a San Francisco consulting organization. But, he adds, intranets go beyond client/server, which is usually aimed at database access, by enabling a major employee communication tool for collaborative applications such as whiteboarding, conferencing and threaded discussion.

Using an intranet, you don't need to design yet another proprietary client/server access tool — credit the browser, again. And numerous HTML-to-database middleware packages are available.

Truth No. 1: It doesn't take much to get started.

Intranet enabling technologies are basic. In fact, they're probably installed in your network already. The lineup includes TCP/IP, Network File System, browsers, Web servers, an HTML editor and e-mail. It's not the Rosetta stone, but IP connections are an equalizer for access. Macs have shipped for years with Mac TCP, Unix machines always have spoken this language and TCP/IP is built into Windows 95.

It doesn't have to be expensive, either.

Those are the intranet advantages: a reasonable price tag, quick (if not immediate) gratification and strong potential for continuing return.

"We do not employ technologies at Geffen simply because they're a little faster or a little cheaper," says Jim Griffin, vice president and technology director at Burbank, Calif.-based Geffen Records, Inc., which has had an intranet for about two years. "Our goal is to enable our company to do things we could not do before."

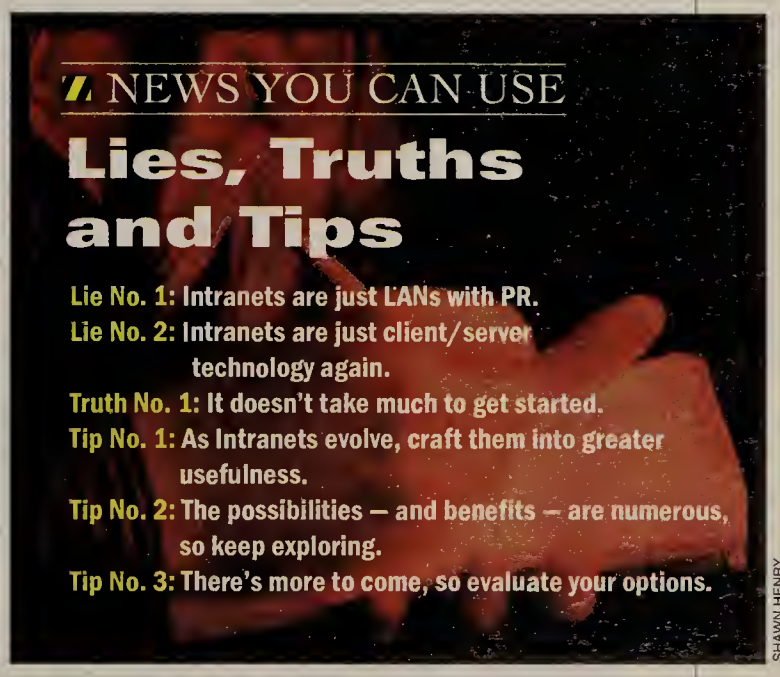
DAVID POWERS

■ "MY CEO IS MY BIGGEST PROPONENT . . . THE INTRANET IS HOW WE SHARE INFORMATION NOW."

Sandra Sully, CIO, Xilinx, Inc.

Tip No. 1: As intranets evolve, craft them into greater usefulness.

Users around the globe are welcoming intranets. "But it's not 'build it and they will come,'" says Michael Rudnick, a partner at Cognitive Communications, Inc., a Web consulting firm in New York. "They'll come once, maybe twice."



SHAWN HENRY

Make your intranet useful by involving employees in the design, implementation and maintenance — especially the latter, as you don't want responsibility for all the content updates.

"You've got to hook them. You've got to get them business value," says Cathy Clark, strategic communications consultant at Duke Power Co., of Charlotte, N.C. Clark also lured users with a quarterly online quiz about company activities and awarded winners five shares of stock.

It also helps significantly to have senior management buy into a corporate Web. Executives should log on, post, promote and defend the effort. "My CEO is my biggest proponent of the intranet," says Sandra Sully, chief information officer of Xilinx, Inc., a San Jose, Calif., chip maker that built an extranet to communicate with its outside sales force and distributors.

Tip No. 2: The possibilities — and benefits — are numerous, so keep exploring.

"Nobody's going to do the whole thing at once," says Michael Josephs, executive director of products and services for Concept Five Technologies, Inc., a consulting firm in McLean, Va. "The companies that succeed typically pick a couple of services, particularly ones that have universal appeal, and replace an older way of

doing something, to promote the intranet."

To make your intranet more interactive, it is useful and feasible to integrate it with existing corporate databases, be they PC-based SQL databases or legacy systems. A broad selection of tools can make host data available on Web pages, often by using on-the-fly HTML conversion, enabling online transaction processing via a browser.

Making your intranet business-critical usually requires opening the gates. Extranets, or intranets that welcome specified outsiders, extend your intranet as a platform for business-to-business transactions that are more efficient and faster online. Applications range from disseminating the latest collateral to sales representatives to providing customers access to online catalogs. This also is a step toward selective, Web-based electronic commerce.

Morphing your intranet into an extranet requires additional security. Besides firewalls, you may want to consider multilevel passwords. Some companies mirror outsider-accessible portions of the intranet, rather than allow customers or business partners directly into the corporate network. Or you can create a so-called demilitarized zone, a secure portion of the intranet that is accessible via the Internet by business partners or customers. Even if this makes you nervous, it's likely your customers will soon request it.

"Web technology has changed the way we have to provide information to our customers," says

"INTRANETS HAVE CHANGED HOW WE HANDLE INFORMATION INTERNALLY, AS WELL AS HOW WE PROVIDE RESOURCES TO OUR CUSTOMERS."

Marck Shipley, vice president of information technology, Knight-Ridder Information, Inc.

Marck Shipley, vice president of information technology at Knight-Ridder Information, Inc., of Mountain View, Calif. Had Knight-Ridder not adopted Web technology, its customers would have pulled the company into it by their requests for information in browsable format, he explains.

Tip No. 3: There's more to come, so evaluate your options.

Web technology is young, although prolific. A number of technologies bear watching because they'll help move intranets beyond basic publishing platforms. Multimedia is one.

But if you don't have that multimedia technology in place yet, you can wait. Vendors are refining the technology and building it into products rather than relying on plug-in capability. Multimedia gobbles bandwidth, so your intranet will need to be robust to handle it. Don't get pushed into this too soon.

Speaking of push, broadcast/subscribe technology also is shaking out. Its promise for the corporate Web is improving as vendors start to develop versions of their Internet-related products for intranets. "Push allows you to personalize the information distributed," says Pat Mitchell, an information manager at Hartford, Conn.-based Aetna, Inc., which is evaluating the technology as an efficient way to update its numerous field agents and offices. "I think we'll see more of it." But many intranet managers aren't hurrying. In addition to the version tweaks, Microsoft and Netscape Communications Corp. are building the function into their browsers.

Whatever you're evaluating for making your intranet more dynamic, keep the mission in mind. Your objectives aren't bandwidth and packets, but productivity, the same as before the Web wove its way into your corporation.

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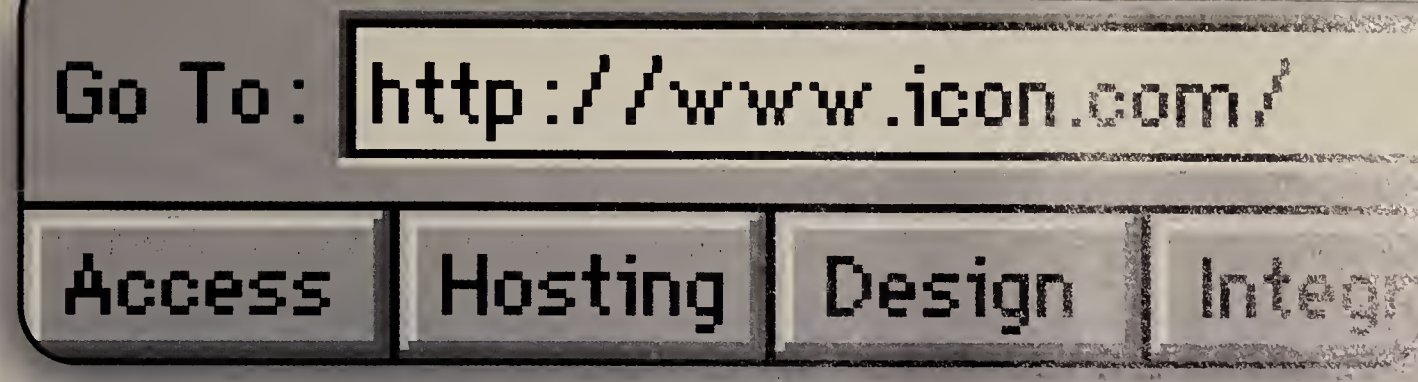

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Electronic commerce dos and don'ts

BY ELLEN MESSMER

The concept of electronic commerce has been around since the time the telegraph was invented. But electronic exchange of business documents didn't take root until the early 1980s, after the transportation industry created a set of standard data elements so railroads and steel mills could signal computer to computer that railcars were en route. Electronic commerce has been on the fast track since.

With the wide, if bumpy, road of the Internet now in place, plus the multimedia World Wide Web, more businesses than ever are thinking hard about electronic commerce. Here are routes to take and obstacles to avoid along the electronic commerce path.

Steps to take

Define your business goals

Do you simply want to advertise your products or services on the Web, but stick to the phone, fax or mail to handle actual purchase transactions? Do you intend to market to your established trading partners or seek out new business? Or do you intend to use the Web to advertise and sell to consumers? Business factors such as these will make a difference in how you design your electronic commerce system.

To market to consumers, your Web server would probably display standard pricing, though merchant servers can be set up to personalize the shopping experience for repeat customers.

In contrast, your corporate trading partners generally work under prearranged contracts with unique product pricing based on volume and payment terms. You may decide to let your trading partners into a specially secured part of your intranet to share business data.

Follow the money trail

Businesses selling goods over the 'Net to consumers need to decide whether or not to accept credit cards from strangers. Some businesses do not because of concerns about fraud. They prefer to set up registered accounts for customers after verifying basic background information. Those that do accept card numbers process these orders using Secure Sockets Layer (SSL) session encryption, technology widely supported in Web browsers and servers. However, SSL leaves the card information decrypted on the server, which can expose the information to hackers or even unscrupulous employees.

Get set for SET

Visa International, Inc. and MasterCard International, Inc. are not giving their official blessing to credit cards over the Internet until a standard called Secure Electronic Transaction (SET), finalized in June, gets implemented in merchant servers and Web browsers.

In order for SET to work, merchants, banks and credit card users will need to receive "digital certificates" to authenticate buyers and sellers. This is expected to occur during the second half of this year.

It will cost online merchants some dough to upgrade their merchant servers to be SET-compliant, but the card associations are expected to make it worthwhile by reducing the rates they charge to merchants.

Why so generous? SET is expected to lower the risk of bad credit transactions on the 'Net because an end-to-end encrypted authentication process between consumer, merchant, bank and card association can occur in a standard way.

Know where you've been

For more than a decade, larger companies have used electronic data interchange and value-added network (VAN) services to exchange important and time-sensitive documents such as freight notices and purchase orders. Now companies are beginning to view Internet e-mail, file transfer and Web forms as an alternative to EDI software.

They also are considering VANs because VANs use proprietary protocols and typically charge by the byte.

However, companies have invested millions of dollars in EDI data-mapping and translation applications that run on mainframes and Unix systems tightly integrated into back-end financial systems for automated processing.

So the challenge is to gracefully combine the old and the new.

Take your EDI manager to lunch. You will find out a few secrets about what it takes to get technical, accounting and marketing people to work together on an electronic commerce project.

Join your vertical industry flock

Like birds of a feather, businesses flock together, whether they be electric power plants, automakers or insurance companies.

A number of important industry-specific electronic commerce efforts are under way, such as Detroit's Automotive Network Exchange, headed by Chrysler Corp., General Motors Corp. and Ford Motor Co. There also are more generalized technical frameworks, such as the Open Buying on the Internet specification, which wants to make exchanging purchase orders on the Internet more secure.

Keep an eye on the feds

By 2001, U.S. government agencies plan to be issuing requests for quotes from suppliers and awarding contracts almost exclusively over what's called the Federal Acquisition Computer Network (FACNET).

You probably shouldn't ignore FACNET, and if you want to get registered as a federal contractor under the electronic commerce rules, you'll have to do so by next March.

You'll also have to find out what software and VANs have been accredited by Uncle Sam for electronic commerce. A good place to start is www.acq.osd.mil/ec or call (800) 334-3414. Since the FACNET project started five years ago, the Department of Defense has blasted out some mission-impossible technical changes, so brace yourself.

In another area of federal electronic commerce, the Department of the Treasury this year

began requiring thousands of businesses, based on their revenues, to file payroll-related taxes electronically instead of mailing in a check.

Worry about security

This is an area in which you can never stop worrying because there's no such thing as total security. If you're lucky, you will have a security guru on staff who can make sense of the alphabet soup of security acronyms, such as S/MIME, SSL, SET, IPSec, OPSEC, RADIUS, RSA and PGP.

It's hard to find objective information about security because vendors tend to have their own agenda, and no one wants to admit their products may not solve the whole security puzzle. However, the Carlisle, Pa.-based trade group National Computer Security Association provides benchmarks and other information about firewalls, computer viruses and hacker gambits, such as sniffing passwords or breaking into Web sites by exploiting buffer overflows.

Encrypted passwords may help you elude the wily hacker, but companies should examine how more advanced technologies such as public-key certificates, single sign-on or dynamic-password tokens, can be used for authentication.

Outsource, outsource, outsource

Chances are, you can't assign every task associated with an electronic commerce project to someone within your company. Your staff just won't have the time or the skills. You may well need outside help in Web development and Web server outsourcing.

The bigger Internet service providers are ready to help, but their terms differ greatly. If your company has some favorite systems integrators it has used in the past, call them up. Many have worked hard to gain Web-related skills, and the companies are already familiar with your back-end systems.

Some of the newer Web-development firms certainly deserve a look.

Get the entire organization on board

The "Dilbert" comic strip aptly illustrates the emnity that often exists between technical and marketing departments within organizations. But coordination between marketing and the network division must occur for a successful electronic commerce project. You need a team, a project leader and buy-in from upper management.

Don't overlook upper management buy-in because this is going to cost some money and maybe a lot of it. Some estimates have the cost of a Web site running from half a million to $1 million dollars and more.

Mistakes to avoid

Don't ignore cyberspace legal issues

Your business may be on the 'Net, but that doesn't mean you have somehow been transported outside existing law. If anything, life could get more complex as states and countries demand taxes on sales made over the Internet or if Congress makes new Internet laws. KPMG Peat Marwick for one has assembled a stable of accountants that specialize in electronic commerce tax issues. And more lawyers appear to be getting cybersavvy as they realize that part of guarding their clients' interests may involve fighting over domain names or copyright violations on the Web.

In addition, because your electronic commerce effort will likely involve use of encryption, you need to know that encryption is regarded by many governments — including the U.S. — as a military weapon, and it is regulated accordingly. The Department of Commerce or security product vendors can provide some information in this area. But unfortunately, you'll probably need to check with a law firm that specializes in this to make sure you're not violating the law in other countries.

Don't spam

Sure, maybe the hundreds of thousands of people on the 'Net would buy your company's widget if they only knew about it. But spamming them with unsolicited e-mail will only get you angry e-mail bombs, not to mention a bad reputation. Some of the ISPs will kick you off their networks, too.

Don't play Big Brother on the Web

As a Web merchant, your first instinct will be to collect every scrap of information you can glean from your Web visitor for marketing purposes. And you may not want to disclose to your visitor what you do with that data or give the visitor a chance to opt out of giving it to you.

But European nations, and now the U.S. government's Federal Trade Commission, are voicing fierce opposition to certain data collection practices. Collecting information about children, in particular, is becoming a hot potato. Your Web practices could actually make you a criminal in some European nations, such as Belgium.

So you might be better off taking the high ground, as McGraw-Hill, Inc. has done, by publishing a privacy policy accessible to Web site visitors. For tips on devising such a policy, check with the Direct Marketing Association or Computer Professionals for Social Responsibility, both of which are in Washington, D.C.

Don't underestimate hackers

Some of them are just young, smart and testing the limits of your security vulnerabilities for the hell of it. But others are ruthless and destructive. They'll steal credit card numbers off your Web server if you store the numbers there and break into your network through your Web server. All in all, hackers pose perhaps the single greatest threat to electronic commerce because they have the power to erode merchant and consumer confidence.

Try hacking into your own network using vulnerability-assessment tools such as those from Internet Security Systems, Inc., Haystack Labs, Inc., Bellcore or Wheelgroup, Inc. Also, run operating system audits using tools from companies such as Axent Technologies, Inc. You can even try out hackers' tools, such as Crack. Here's hoping you won't find it too easy to break in.

Don't disrupt your distributor relationships

More than ever, the Web offers the potential to bypass your distributor chain and go directly to your customer. So your company will have to fully evaluate how the Web will affect the distributor relationships that could be the lifeblood of your firm.

Think positively: In one interesting "extranet" application, a manufacturer gave authorized access to shipping data to a major distributor, which delivered this information on demand to second-tier distributors electronically. In general, remember that your online operations have to make sense within the context of the rest of your business.

Don't stop thinking about tomorrow

Once that Web site for handling transactions or publishing business information is up, at least one person, and perhaps several, are going to have to update the content. And someone will have to respond to customer inquiries or troubleshoot problems. Make sure that electronic commerce upkeep is well defined.

In addition, one of the hardest things to do is to improve something immediately after it's done. But hardly anyone gets it right the first time. Stay on the lookout for new chat, video and push technologies that will assist you in reaching customers more effectively or building communities of interest. New electronic payment technologies, such as those from CyberCash, Inc. and Mondex International, Ltd. are not mainstream yet, but they are worth keeping an eye on.

Don't ignore your competition's efforts

As you're sketching out your electronic commerce plans, check out what your competition is doing whenever possible. United Parcel Service of America, Inc. and Federal Express Corp. say they watch what the other is doing. Some analysts predict that consumer shopping on the Web will be driven by a race to find the least expensive prices possible on goods because automated Web searches to find such supersale prices will be common.

Don't overdesign your Web site

Simple is beautiful. No visitor wants to spend more than a few moments downloading graphics from your site, especially if the graphics consist of only banner advertising. Virtual Reality Modeling Language is an intriguing technology for creating alternate realities. But with the Internet bandwidth situation what it is these days, you're lucky to get any reality at all.

Don't think the Web is a magic wand for money

There's been a wonderful electronic commerce device out for about 100 years now. It's called the telephone. And now there are fax machines, too. Together, these devices handle most electronic commerce transactions. Contrary to some of the hype, Web-based electronic commerce is not going to eliminate 800-number call centers.

But Web technologies increasingly are going to be used in call centers. Most Americans, born before the age of the computer, are still getting used to the Web. But the next generation will not know life without it, so there's every reason to believe that electronic commerce will grow up fast.

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How is your company POSITIONED for changes in th

Yogesh Gupta
Sr. Vice President of Product Strategy
Computer Associates International, Inc.

Enterprise management is one of the most critical issues facing network administrators today, and CA's Unicenter TNG offers an entirely new solution to meet this challenge. Unicenter enables organizations to monitor business service levels and manage their enterprise environments while driving down the total cost of technology ownership.

Bill Rosenberger
President and CEO
Netaccess
(A Brooktrout Technology Company)

Netaccess is positioned to be a technology leader in the Open RAS market. With our Instant RAS product line and Netaccess AnyCall Technology, we offer unparalleled communications server solutions for Windows NT environments. Open RAS Servers using Instant RAS are able to instantly recognize what's coming its way – whether it's 56K, analog, PRI or BRI. Moving forward it's imperative to be able to accommodate any type of call.

Deborah Triant
President and CEO
Check Point Software Technologies, Inc.

The widespread adoption of enterprise security technologies has made the Internet an important paradigm in conducting business, bringing with it network 'traffic jams' of critical proportions. With both security and traffic management decisions taking place at the same network access points, Check Point is uniquely positioned to address customers' converging network security and performance needs.

Richard P. Faletti
President, Enterprise Networks
Nortel (Northern Telecom)

In our increasingly digital global economy, the network is the business. Nortel has developed a new approach to networking called Nortel Power Networks™. These next-generation enterprise networks transform disparate business networks – including voice, data, Internet/intranet, wireless, fax and video – into integrated multimedia networks with increased performance to power business goals.

Phil Trubey
President
NetPartners Internet Solutions, Inc.

Many useful Internet technologies have been held back from realizing their full potential due to their immaturity. We entered the firewall business because a lack of good security was threatening widespread corporate use. Today we're focused on professionalizing Web usage through monitoring and reporting tools. Next year, we'll be tackling other technologies that need help to become widespread.

Andrew May
President & CEO
Paradyne

The "new" Paradyne is not about history. It's about making history – developing industry-defining technologies that facilitate high-speed network access for communications, computing and information: award-winning DSU/CSUs, HotWire™ DSL products, frame relay and TDM solutions for commercial customers, ISPs, FRSPs, NSPs and campus environments through a worldwide network of distributors and VARs, including Lucent Technologies.

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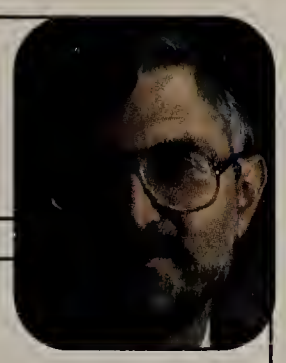
o deal with the NETWORK industry?

George Abou-Arrage

Vice President, Marketing
MICOM Communications Corp.,
a Nortel (Northern telecom) company



MICOM is strategically positioned to provide the integrated voice and data networking solutions that today's small to mid-sized enterprises need. MICOM's new V/IP product puts voice and fax over any IP network. ISPs can also use V/IP to provide voice and fax services. Independent tests confirm V/IP offers toll-quality voice and it handles real-time faxing, making it a viable "fax only" solution as well.

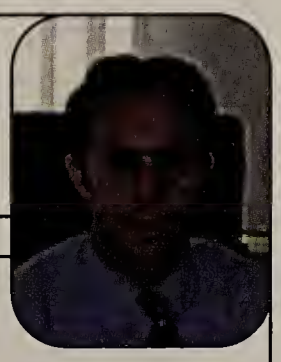
Dr. Hanafy Meleis

SVP of Strategic Direction/CTO
Racal Data Group

Internet... available for use in the infrastructure of the backbone of mission critical applications? Not yet! The backbone and interconnect architecture needs to be rethought before a truly ubiquitous "data dial tone" service can be provided. Racal is actively searching out solutions to solve the barriers and bring high-quality services to the emerging information network.

Nick Hill

Managing Director
ITT Cannon Network Systems & Services



ITT Cannon Network Systems & Services is committed to producing the world's most advanced structured cabling systems. Servicing the networking industry's most demanding users, we continue our tradition of setting new benchmarks with the introduction of GigaPath – the world's first copper cabling system guaranteed to support Gigabit Ethernet.

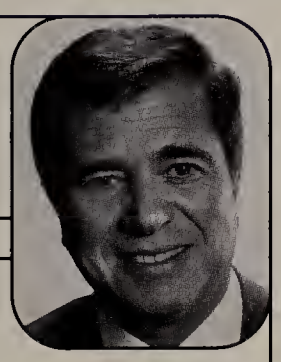
Par Chadha

CEO
Osicom Technologies, Inc.

To meet today's growing network mobility and volume demands, wire-centric networks will embrace both wireless and photonic technologies. Wireless-enabled networking will enhance wire-centric networks with mobility and increased bandwidth to the end-user. Photonic innovations, such as dense-wave-length division-multiplexing, will increase bandwidth exponentially in corporate network backbones. Together, these technologies will soon take hold and shape our industry for the future.

Dr. Marco M. Genoni

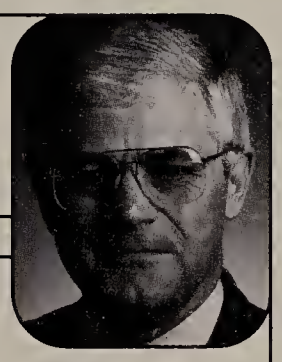
President and CEO
Memotec Communications, Inc.



Memotec Communications understands the increasing requirement to provide comprehensive, solutions-based approaches to the LAN-WAN connectivity needs of medium and large businesses. At the same time, cost control and upgradeability have become crucial determinants in this process. Memotec addresses these challenges and anticipates the needs of today's IS managers with its award-winning family of integrated Frame Relay access devices (FRADs) and edge switches.

Gary McGuire

President and COO
WilTel Communications, LLC



WilTel Communications, LLC (WilTel), with headquarters in Houston, Texas, provides equipment and multimedia integration services for data, voice and video throughout North America. Our customer-focused approach eliminates the hassles of vendor finger-pointing by taking responsibility for network design, maintenance and monitoring at more than 122,000 customer sites.

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From Here You Can See The Future Of Remote Access.

It's called server-based communications, an innovative, open-systems approach to remote access. And by reducing ownership and maintenance costs, while delivering users maximum performance, it's changing the economics of business communications.

investment, efficiently integrates both your network operating system and your applications, and minimizes long-term hardware costs by using standard, off-the-shelf equipment. And when it comes to installation and configuration, your network

Server-based communications is the result of dramatic and continuing advances in computers, network operating systems, open APIs, and adapter cards that empower your server with the performance, intelligence and reliability to tackle business-critical applications like remote access.

Using a server to host your communication functions maximizes your company's technology administrator is already qualified, eliminating the long and often costly training cycle common to proprietary technologies.

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Thin isn't for everyone

Thin clients are touted as a cost-effective alternative to PCs, but their initial price tag isn't much lower, and you may have trouble finding Java apps to run on them.

BY JOHN COX

Stop thinking of "thin client" as "starving client" — think of it as "lean and mean."

MIS groups are piloting different types of thin-client computers to confirm whether they pose a viable, less expensive alternative to the PC. So far, the answer seems to be yes, at least for certain users and applications.

Most of the current deployment is occurring in areas where thin-client computers were expected to do well — as replacements for dumb terminals linked to Unix servers or IBM mainframes. PCs running custom, task-oriented applications such as data entry or call center operations are another likely target.

THIN CLIENT

But early experience also shows that properly deployed thin clients — with enough local memory and back-end server power on a reliable network — can meet the computing needs of a surprisingly wide range of users.

Perhaps you've heard that thin clients usually cost less than desktop PCs. Windows thin-client pricing ranges from about $650 to $900, but various options quickly can boost the sticker price. Java thin clients require more memory and powerful processors, raising the price tag to roughly $700 to $1,700. Again, hardware and software add-ons can make them as pricey as some PCs.

Thin-client installation usually is much easier than configuring a PC because thin clients are designed to fit into the existing application and network infrastructure. But the initial cost of deploying thin clients may be only marginally less than the same number of PCs in a large-scale rollout. The real savings are expected to occur later, when managers need to deploy new applications or add or change users.

That's not to say you could deploy these things blindfolded. For one, there aren't many applications and servers for Java thin clients to choose from. And the limited scalability of Windows NT servers hampers Windows thin-client deployment. Hundreds of thin-client desktops may require scores of such servers to ensure adequate performance.

What's more, administrative tools for either type of thin client are scarce and immature. In the meantime, you must use DOS batch files to automate installation and configuration.

Finally, there's little hard data on the exact impact many thin clients have on network traffic. But early deployers haven't seen either type of thin client bog down existing, well-designed networks and find the additional load manageable and acceptable.

Categorizing classes of users

Initial users fall into two broad classes — those accessing Unix and mainframe applications and those accessing Windows applications.

"Our research shows there is a level of senior management users where thin clients fit well," says Greg Blatnick, vice president of Zona Research, Inc., of Redwood City, Calif. "They want to access rather than locally process information. The other areas [where thin clients fit] are data entry and customer service."

Java isn't yet a major influence at most sites. "Today most companies are not using Java for anything like enterprise-class applications," Blatnick says. "Java is used mainly for enhancing HTML content on Web pages. But they have a

NEWS YOU CAN USE

How to identify the different species of thin clients in the wild

The thin-client computer family generally has two different species — desktop-oriented and server-oriented. Both types rely on a server, but in different ways.

Commonly dubbed a network computer, a desktop-oriented device downloads Java applications and runs them on the desktop. It also downloads a proprietary mini operating system that governs the computer's operations and runs the applications.

The other kind of thin client is commonly referred to as a Windows terminal. It connects to a server that usually runs a multiuser version of Windows NT based on Citrix Systems, Inc.'s WinFrame software. The applications run on the server and transmit the display screens over the network to the desktop thin client.

Most thin-client vendors offer models or software options that combine these capabilities and provide access to Unix and mainframe applications.

Physically, the devices can sport almost any peripheral. Most thin clients don't have any type of local floppy drive. However, some models let users add drives or other devices if they wish.

pretty high level of interest in Java, so it's likely to be a factor in the future."

Which type of thin client, if any, is best for you depends on a wide range of variables. The key questions are: How important is it to administer a distributed desktop environment, and what do your users need to do?

If they're only accessing Windows applications, a Windows terminal will suffice. You may want to include optional software to access the odd Unix or mainframe host application. But a Java client may be better if Windows isn't a fundamental part of the network and you want to embrace Java in the future. Both types of devices increasingly can do the same job if you add some software.

Burlington Coat Factory Warehouse, Inc., of Burlington, N.J., is replacing a mix of terminals, PCs and Unix workstations with about 1,000 thin clients. The company chose to deploy the @workStation from Neoware Systems, Inc. (formerly HDS Systems, Inc.), of King of Prussia, Pa. The Java network computer runs Neoware's client operating system and accesses Burlington's core Unix applications. In the future, more employees will need to access the company's growing intranet.

For years, Burlington has based its computing on large Unix multiprocessor-based systems that run big, centralized databases and applications. Michael Prince, Burlington's chief information officer, sees almost no limit to who can use the thin clients in such an environment.

"We have some people designing store layouts using AutoCad software," he says. "The secretaries in our legal department are heads-down in WordPerfect all day long. And we have some merchandisers with laptops and spreadsheets. They'll keep their PCs."

In general, users are able to deploy thin clients without changing their networks or applications. Wisconsin Indianhead Technical College in Shell Lake runs its applications on AS/400 servers. The systems administrator deployed six IBM Network Station thin clients by loading IBM's Net-work Station Manager software on an AS/400 and accessing it with a Web browser to configure the thin clients. The server software has been stable and easy to use, says Ray Peterson, an IS specialist at the school.

At Burlington, Prince recently converted about half of the merchandise accounts payable department's 70 users to thin clients as part of a move to deploy Oracle Corp.'s Financials application on a multiprocessor Unix server. In the past, these workers used terminals. Two technical support specialists installed 36 of the Neoware thin clients in a week.

Sun Microsystems, Inc. rolled out 3,100 of its JavaStation I thin clients internally by the end of July — the largest known deployment to date. Few hard statistics on network use were available by press time, but Sun MIS managers say they've seen little impact on the network.

"Our initial monitoring showed more frequent traffic, but the size of the packets was smaller, so it seems like a wash," says Ann Wondolowski, Sun's director of the Information Resources Java program.

Performance is affected by many variables. But Wondolowski says the most important appear to be those associated with the database and application servers, not with the JavaStation or the network load.

You face additional costs if you're deploying Windows thin clients — which are accessing applications running on an NT server — and you want existing Unix applications to run on NT. You have to rewrite the applications and ensure they work with their companion applications and back-end databases.

For example, Retired Persons Services, Inc. (RPS), the mail-order pharmacy arm of the American Association of Retired Persons, of Alexandria, Va., will eventually deploy about 1,200 Neoware @workStations.

Call center representatives currently connect to a Unix version of the main pharmacy program, but RPS has ported a few parts of this application to NT-based NTrigue software from Insignia Solutions, Inc. NTrigue, in turn, incorporates Citrix Systems, Inc.'s WinFrame software.

The ported applications have to be tested to make sure they run properly and work with each other and back-end databases, according to D. J. Jenkins, a systems administrator at RPS.

There also can be a host of niggling changes that can interfere with smooth deployment. RPS staff had to work patiently with Neoware and a small flock of software vendors to get the right terminal emulation software for the @workStation.

The ability to print at the desktop, taken for granted by PC users, can be painfully slow on thin clients. One automotive repair chain piloted a thin client from Boundless Technologies, Inc. and found it took 5 minutes for an on-screen picture of a car part to print out, recalls Oscar Smith, president and CEO of major thin-client systems distributor UCSI Distribution, of Kansas City, Mo. Boundless sped up the print time to less than a minute with its Priority Print program that loads into the thin client's ROM, Smith says.

As these sites found, the surest way to know if thin clients work for your computing environment is to test them. The server-oriented thin client, especially with its focus on Windows applications, is more mature than the desktop-oriented thin client, which is not so widely available and still is waiting for a portfolio of third-party and homemade Java applications.

The numerous thin-client pilot projects now underway demonstrate that MIS groups have already decided the thin-client idea has merit. The pilots will determine in the next few months if it also has a future.

Client-oriented thin client: Neoware's @workStation

VENDOR: Neoware Systems, Inc., King of Prussia, Pa.

PURPOSE: Download and run Java applications on a desktop (optional software for accessing Windows servers and Unix and mainframe applications)

HOW IT WORKS: @workStation runs Neoware's compact netOS, which includes a Java Virtual Machine. The unit also features a browser, audio and video support and X Server.

FEATURES: Intel I960 RISC processor; supports resolutions up to 1600 x 1200; twisted-pair Ethernet connection, one serial and one parallel port; up to 128M bytes local memory

BENEFITS: Uses standard network protocols; minimizes ongoing network load; applications can be centrally updated and distributed. Optional PCMCIA or internal hard disk, flash memory and terminal emulation suite

DRAWBACKS: Few Java applications are ready; may need more memory for large or complex programs; downloading can take a long time

PRICE: $849 with color monitor

Server-based thin client: Wyse's Winterm 2500

VENDOR: Wyse Technology, Inc., San Jose, Calif.

PURPOSE: Access Windows applications running on an Intel-based server hosting a multiuser version of Windows NT

HOW IT WORKS: Applications run on the server, while graphical displays are sent to the Winterm and rendered.

FEATURES: 14-inch color terminal with 256-color support, SVGA resolution (800 x 600), two serial ports and one parallel port

SOFTWARE: Citrix System's Winframe server and clients; suite of Wyse terminal emulators

BENEFITS: Can improve Windows application performance; centrally manages and updates applications.

DRAWBACKS: Calls for plenty of memory and Pentium-class processing power on the servers

PRICE: $700

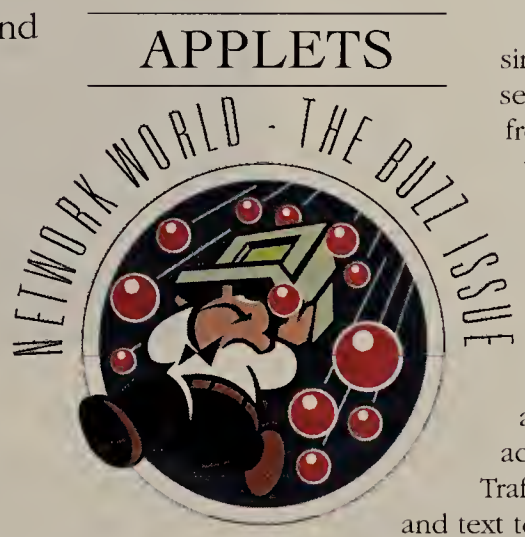
Onslaught of the applets

The proliferation of Java applets and ActiveX components on corporate networks and across the Internet will mean more work for net managers.

BY DALE DOWDIE

The thin client is coming, and that means a slew of applets and components are about to be released across corporate networks and the Internet.

Thin clients — whether they're called network computers, Windows terminals or NetPCs — will rely heavily on Java applets, ActiveX Controls or other components distributed across network servers. Increased use of this component technology undoubtedly will result in more — and more unpredictable — network traffic, which could wreak havoc on companies' carefully crafted corporate networks.



"We plan to utilize the Windows Zero Administration Kit and NetPC thin client to cut down on total cost of ownership, especially in the area of remote administration," says Danny Robinson, senior network engineer at MCI Communications Corp.'s MCI Systemhouse outsourcing subsidiary in Chelmsford, Mass. "One of our big concerns will be the network load introduced by these thin clients as they run more server-centric and intranet applications."

Steeling your network for the applet onslaught will involve ensuring that your servers are powerful enough and located in the right spots. You'll also need to make sure you have enough network bandwidth and that end users are not able to download programs that do more harm than good.

Key components

More and more developers are writing software components to create Web pages with active content or utilize Internet technologies to share information throughout a corporation. The components, most often written as Java applets or ActiveX Controls, are plugged into Web browsers or other containers to create applications. Within the containers, components can be loaded from local disk, file server or Internet server.

Many components may perform single functions but will request services and other components from multiple servers throughout the corporate network in order to complete their functions. Such extensibility makes it difficult to keep track of the impact component traffic will have on the network, particularly as multiple users run applications simultaneously across the network.

Traffic can range from simple HTML and text to graphics, bursty files and multimedia applications. In fact, an applet or control can comprise one or all of these data types.

"We try to streamline our ActiveX Controls and intranet sites to minimize network impact, but [the controls and sites are] really driven by the clients, who usually want voice, video and graphics all on one site," says Kenny Granderson, president of Inner-City Software, an application development firm in Roxbury, Mass.

So much for the traditional network environment in which administrators had grown accustomed to carefully planning for traffic flows and bandwidth requirements associated with a network operating system upgrade or new client/server applications.

Still, there are steps network managers can take to keep their networks from going haywire.

Steeling the network

The first step is to implement and enforce strict company policies for Internet access and the deployment of intranet servers.

Most organizations already have some form of Internet access policy. However, few have written policies limiting and controlling deployment of intranet servers.

The IS department must take control of intranet servers from the start. It is not so much a matter of administering server content as making sure the servers conform to the same or even more stringent requirements of other corporate servers.

NEWS YOU CAN USE

Preparing for applets

Server Performance

Define standards that ensure your machines are up to the task of hosting an increasing number of applets and components. Define which processors the servers should be based on as well as minimum memory (you can't have too much RAM) and disk capacity requirements.

Network Performance

Upgrade to 10M/100M bit/sec switches and deploy Remote Monitoring tools to track applet traffic. Also, use proxy servers to keep copies of applets close to end users, thereby cutting down WAN traffic.

Mushrooming Intranet Servers

Centralize management of intranet servers and use proxy servers to keep copies of applets close to end users.

Viruses, Hackers and Security Flaws

Document and enforce a corporate policy related to Internet downloads, and use firewalls to restrict access to specific intranet resources.

PHOTO: SHAWN HENRY

As intranet servers hosting components and applets become more popular among end users and more critical to day-to-day business activities, performance and uptime become a bigger concern. The IS department needs to document required processor, memory and disk capacity levels for the servers, just as the department would do for the company's e-mail, database and other business servers.

The most important requirement is memory. A machine should have at least 64K bytes of RAM and probably should have twice that. It's impossible to have too much RAM. In fact, the processor doesn't need to be so powerful if the memory is there. Disk capacity will vary depending on the company and applications being used.

Bandwidth concerns

The servers also must be strategically placed to maximize performance and minimize management hassles. Centralizing them will ease management, while distributing them can help cut down on network traffic across wide-area links. Most companies will need a mix of centralized and distributed servers.

Network switches should be used to keep applets flowing across LANs. Deploying Layer 2 switches on the network edge provides bandwidth and performance improvement. Intelligent Layer 3 switches at the network core provide increased traffic control and packet throughput using IP switching, broadcast restrictions and other features.

With prices of dedicated 100M bit/sec ports falling below $100, it makes sense to reserve one of these high-speed pipes for the server, giving end users shared or dedicated 10M bit/sec links.

Many switches also boast virtual LAN capabilities that enable companies to partition end users and servers into logical groups, regardless of where the end users and servers physically reside. VLAN technology can provide the on-the-fly management capabilities needed to keep pace with changes in applet traffic patterns.

"We're putting more and more traffic monitoring and management capability into the operating system of our switches, specifically with the idea that corporations are going to need these tools to support intranet applications," says Mike Prior, a marketing agent at Cabletron Systems, Inc., of Rochester, N.H.

Remote Monitoring (RMON) 2 is perhaps the best of the network performance analysis methods. RMON collects statistical information that allows network managers to prepare models for network use and performance.

Trends can be analyzed by a set of counters, which over time identify regular and predictable changes in network utilization. RMON also determines when bandwidth-intensive assignments should be scheduled and when additional bandwidth is needed.

Some vendors, such as BMC Software, Inc. of Houston and Optimal Networks Corp. of Palo Alto, Calif., are delivering products specifically geared to monitor users' access to Java applets and the distribution of component-based applications across an intranet. The tools can help network managers determine whether performance issues are attributable to inefficiently designed applets or components or problems with the network infrastructure.

Other vendors, including Computer Associates International, Inc., of Islandia, N.Y., Hewlett-Packard Co. of Palo Alto, Calif., and Tivoli Systems, Inc. of Austin, Texas, also are incorporating modules into their platforms for managing component technologies.

Firewalls and proxy servers

Another way to ensure good network performance, while also keeping an eye out for harmful applets and components, is to set up a firewall, proxy server or both.

These are important options given that not all components downloaded off the Internet are safe. Some may contain viruses, some may destroy files and others may extract private information from corporate Web servers and end-user desktop machines. In addition, hackers have proven adept at finding and exploiting component technology loopholes.

Firewalls and proxy servers can be used to enlist strong memory protection, signatures, encryption and authentication of ActiveX Controls as well as run-time verification on Java-enabled browsers.

A proxy server can act as a firewall, protecting end users and corporate Web servers from direct outside access and controlling the sites from which your users may access or download information.

At the same time, a proxy server gives end users fast Web access and cuts down on the need for them to go out over the WAN to get the information they need.

New proxy servers from companies such as Microsoft Corp. of Redmond, Wash., and Netscape Communications Corp. of Mountain View, Calif., provide enhanced performance for Internet access by caching thousands of frequently requested sites on the local server, updating the cached pages on a predefined schedule and providing end users with rapid access to the cached pages.

Proxy servers also can make an intranet more manageable because the applets and components need to be deployed only on a central server. The programs can be replicated to other servers, however, for easy end-user access.

In addition to firewalls and proxy servers, new applications are emerging that are designed to identify and deactivate dangerous ActiveX and Java programs.

For example, Finjan Software, Ltd., of Netanya, Israel, sells a Web browser scanner that verifies safe programs for passage through a network, while cordoning off unsafe programs in a separate database. The company also offers a kit for building security into Java and ActiveX applications.

The onslaught of applets and components is upon us and only the wary will survive.

Dowdie is president and CEO of Intellitech Consulting Enterprises, Inc., a technology consulting and Internet/intranet development firm. He can be reached at ddowdie@intellitech.net.

Defining applets and controls

Java Applets

- Java has become one of the most in vogue programming languages. An object-oriented language with roots in C and C++, Java can be used to create applets and applications that will run on any computer system without rewriting code for each platform.
- Java is best known for enabling the creation of applets. These are software components that typically run inside a container called a sandbox, the most common of which is a Web browser. When a Java applet is downloaded from a Web server, the server sends a partially translated version of the applet program — in the form of Java byte code — to the browser. The browser contains an implementation of the Java Virtual Machine (JVM), which is software capable of executing byte code instructions. Once the JVM executes the byte code, the end user sees the result.
- At the same time, the JVM restricts the Java applet from accessing local resources on the machine, which makes most Java applets safe to download from the Internet.

ActiveX Controls

- ActiveX Controls are Microsoft Corp.'s latest implementation of component technology. In fact, ActiveX is an Internet-enabled form of the company's old OLE technology, a foundation for sharing code across Microsoft's programs.
- Each ActiveX control is a self-contained, fully functional object that runs inside a container, typically a Web browser. However, unlike Java, ActiveX Controls are supported by all kinds of containers and can be written in various languages.
- They also differ from Java applets in that ActiveX Controls are binaries, which means the controls have better performance within the container because they do not have to be interpreted by the browser.
- Also, unlike Java, ActiveX is not cross-platform. Most controls will run only on the Windows platform or within Microsoft Internet Explorer browsers on other platforms, such as Macintosh.
- Finally, ActiveX Controls can directly access resources on the local machine and do not have built-in security to protect the machine from harmful components.

PHOTO: SHAWN HENRY

Getting to know knowledge management

BY CHRIS NERNEY

NETWORK WORLD - THE BUZZ ISSUE

MIND CONTROL

Although a consensus definition of the hot new catch phrase "knowledge management" remains elusive, it's not too early for network managers to begin thinking about the steps they'll need to take to implement it.

However it's defined, there's general agreement that the concept of knowledge management will soon translate into big business. Gartner Group, Inc. estimates the industry will grow from a few million dollars today to more than $5 billion by the year 2000.

Is knowledge management the synergistic marriage of new technology to intellectual capital? Or is it merely document management on steroids? And how do you prepare to incorporate it into your organization?

These aren't idle questions for network managers and other IT folks, many of whom will soon need to help define and implement a knowledge management strategy.

Knowledge management is about creating a business process and technology structure that effectively leverages a company's knowledge capital, according to Integral, Inc., a consultancy in Cambridge, Mass. This means managing knowledge assets to optimize their value and provide a return on investment.

Knowledge management may sound like the new kid on the block, but the concept dates back at least a decade. Search-and-retrieval software, databases, workflow software, data warehousing, push technology and the proliferation of intranets have revolutionized the ability of organizations to find, accumulate, organize and access information.

A recent survey by Delphi Consulting Group, Inc., of Boston, shows that 28% of organizations already use knowledge management and another 70% plan to use it in the next year. Yet survey coordinator Nathaniel Palmer says, "The reality is just about nobody is using knowledge management."

Palmer believes knowledge management is more than the sum of its technological parts.

"Knowledge management is not text retrieval, and it is not document management," he says. "Knowledge management is about capturing tacit information. That's the magic, and there is no facility within any document management system to provide adequate means for capturing that."

So knowledge management must go beyond simply retrieving information in some remote database or dusty file cabinet. It must tap into the hidden knowledge of workers and customers.

That's a tall order, but there's no shortage of consultants and vendors willing to try. IT and management megaconsultancies such as Andersen Consulting, Price Waterhouse and Ernst & Young, LLP; search engine vendors such as Verity, Inc. and Fulcrum Technologies, Inc.; and a host of others are vying for a piece of the lucrative market.

Some companies are even hiring chief knowledge officers to design, implement and oversee the knowledge infrastructure.

When you contemplate knowledge management, consider four imperatives, says Tom Elsenbrook, director of the knowledge services group at Arthur Andersen Business Consulting.

"First, clearly articulate the purpose of creating organizational knowledge," he says. "How does it create value for the customer and shareholder?"

Second, develop explicit knowledge and learning strategies and determine what technological changes are needed.

Third, "create structures to implement your strategies," including processes, technologies, communication and collaboration capabilities, he says.

Finally, Elsenbrook emphasizes the importance of "feedback systems to monitor progress."

There are several technical considerations for network managers to address before rolling out a knowledge management system, says Kimberly Fairchild, a consultant for Price Waterhouse's knowledge management practice in Houston.

"You need to have standardized hardware and software and a homogeneous network structure," she says. "If there are remote workers, you need some type of WAN that has a lot of bandwidth. The best [situation] would be to ensure dynamic bandwidth allocation as well as redundancy.

It's also important for network managers to understand how their user community accesses the network.

In addition, the location of your information repositories is key. "You want time-sensitive databases to be more centralized," Fairchild says. Such databases would include those storing newsgroup threads that are updated frequently.

The bottom line for network managers faced with implementing a knowledge management system and strategy is to assemble the required tools to allow workers to share the information necessary to improve the performance of the organization. If you do that, you'll truly be practicing knowledge management.

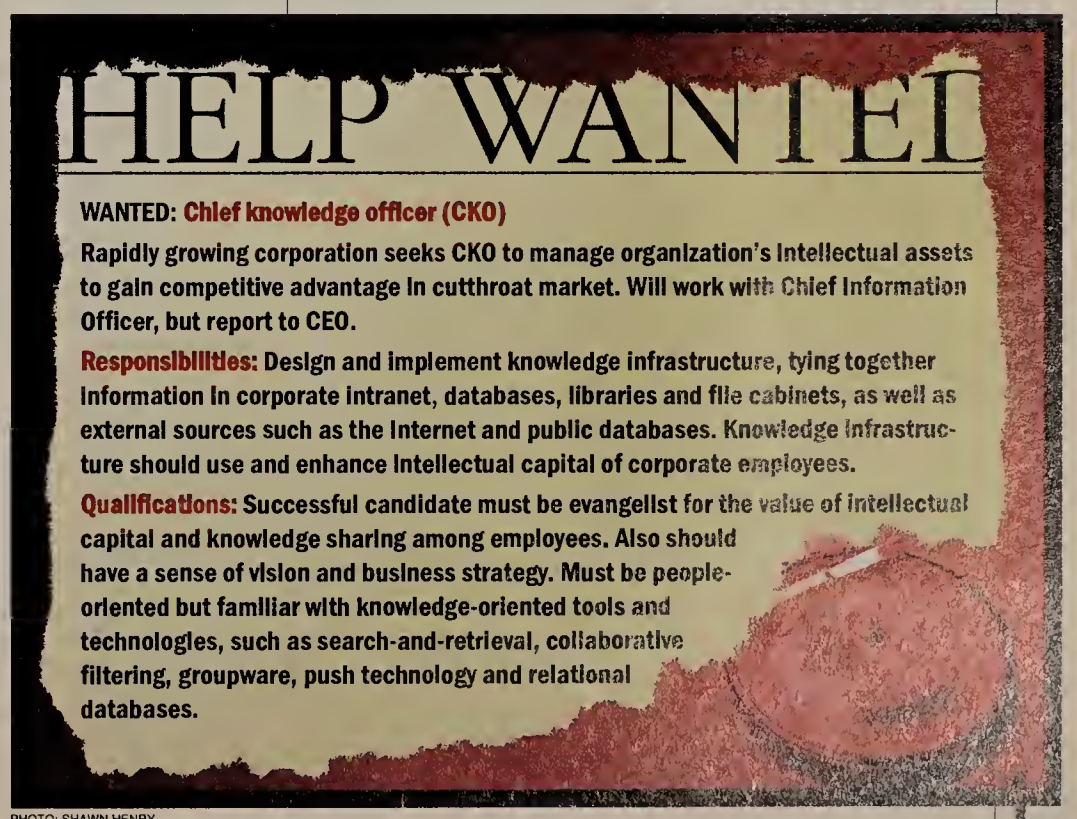


PHOTO: SHAWN HENRY

Year 2000: It's a network

BY CHARLES BRUNO

Mike Kilbane doesn't yet know where he'll spend New Year's Eve 1999, but he's plugging away at a complex problem that may well force him to sweat the final seconds of the millennium at work.

Kilbane is year 2000 project manager at Ingram Entertainment, Inc., a national distributor of video entertainment products. His mission over the next two years is to "make sure the year 2000 bug is a hiccup and not a terrible crash," he says.

Unlike many IT executives who are focusing mainly on the effect of the year 2000 problem on mainframe applications, Kilbane also is investigating its impact on client/server and LAN-based applications. Kilbane, who chairs the Tennessee Y2K User Group, knows something many of his IT colleagues have yet to learn: The year 2000 bug (also know as the millennium bug) will sink its tentacles deep into enterprise networks.

Whether by distraction or fear, many IT organizations have yet to probe into just how the year 2000 bug will affect their voice and data networks. Out of 31 year 2000 user groups contacted by *Network World,* only three have begun examining the effects of the year 2000 bug on networks. Gartner Group, Inc., a Stamford, Conn.-based consultancy, estimates half of all companies affected by the year 2000 issue will not be ready by Dec. 31, 1999.

"People are making a big mistake thinking this is only a mainframe problem," says Tim Chou, chief operating officer of Reasoning Corp., a Palo Alto, Calif., purveyor of year 2000 software.

Indeed, as the clock ticks, date- and time-stamp operations chug away inside scores of voice and data network products.

Interoperability

When it comes to networks, perhaps the single greatest year 2000-related issue is one few vendors will speak publicly about: interoperability among different brands of products. That's the issue that tops Kilbane's list of concerns.

"It's one thing to come out and say you've made a single piece of equipment year 2000-compliant," he says. "But the real crux is to ensure that product will work with other gear."

If you have a hub or router from vendor X and a network management system from vendor Y, each may be independently compliant, but "vendors aren't doing any interoperability testing between them," Kilbane says.

A key concern is the interchange of data, according to Dan Miech, year 2000 product manager at Terasys, Inc., a Naperville, Ill., consulting firm. Because there is a high degree of data sharing between a midrange or high-end host and downstream clients, you need to ensure the date-windowing techniques employed on the mainframe side of the house mesh with the date fixes implemented on the client side. "If the server and the host interpret '00' as two different dates, you'll wind up with data matched to wrong dates," Miech says.

That plays into client/server applications. If a company supports a link between an AS/400 host and downstream Lotus Development Corp. Notes clients, Miech says, any Notes macros tied to the AS/400 will fail if they are not made year 2000-compliant.

PBXs and voice gear

The buzz on the street is that PBX systems and related voice gear may be hit hardest by the year 2000 bug. Even so, Bob Gabriel, senior network engineering specialist at Cornell University, isn't too worried.

Gabriel knows the Lucent Technologies, Inc. Definity switches that support more than 17,000 lines on campus are year 2000-compliant. "We don't expect to lose functionality at all," Gabriel says.

Yet industry observers caution that PBXs are prone to year 2000 complications. While most admit that switches aren't likely to lose dial tone and will continue to provide call processing as the new century kicks off, they caution that important adjunct functionality may be lost.

Services such as time of day or day of week routing and station management detail reports — the lifeblood of bill-back systems — may be rendered inoperative by the year 2000 bug.

Voice response systems and automated call distributors are heavily dependent on date and time stamps. They likely will become confused as the date rolls over to 2000, according to Art Schoeller, research director for voice call processing at Gartner Group.

Because software scripts rule voice response systems, you need to examine the coding for date-related operations, especially for messages directed at the public, Schoeller says. "I'd hate to see calls destined for a live staff go to a recorded announcement that advises callers to try back tomorrow," he says.

MILLENIUM BUG

Similarly, intelligent voice response systems depend on interaction with host applications. While a host programmer may have done the due diligence to correct year 2000 issues, if they forget to update the interactive voice response code, Schoeller says the system may feed incorrect data to callers.

On the voice mail side, systems that rely on message indexing often rely on date stamps to sort messages. If that isn't addressed, messages may be incorrectly sorted or deemed old and automatically deleted.

Messaging systems

E-mail products are likewise driven in large measure by date and time stamps. Come the turn of the century, you could log on to find messages deleted or purged because the software thinks their shelf life has expired, says Daniel Blum, a principal at Rapport Communication, a consulting firm in Silver Spring, Md.

Systems administration will be hit hardest. You may encounter a host of problems: Your oldest messages may post first, and you'll have to scroll to ferret out the new ones. The system may reject new messages with a date it thinks has long since expired. On Jan. 1, 2000, you could lose messages from a day earlier because the system thinks they're 100 years old.

Messaging utilities effectively may be rendered useless, says Joyce Graff, research director of electronic messaging at Gartner Group.

Message tracing, tracking and measurement tools are at risk, Graff says.

Mail passing from LANs to IBM host systems may run into problems because most gateways autoregister Internet IDs and assign them Professional Office System IDs every 90 days or so, Blum says. "You won't be able to get through the gateway since the autoregistration info will time-out," he says.

PC servers and workstations

Potentially, the single greatest area of impact for the year 2000 bug is the hundreds and thousands of servers and downstream clients that sit on LANs companywide.

Why? One word: BIOS. The Basic Input Output System initializes PC workstations and servers, setting up the system date and time by reading values according to a real-time clock chip that keeps constant time for the PC. If BIOS does not successfully roll over to 2000, all date and time references will be invalid, according to Karl Fielder, CEO of the year 2000 consultancy Greenwich Mean Time, Ltd.

problem, too.

Greenwich Mean Time found that 93% of 1996 and pre-1996 BIOSes do not roll over successfully to 2000 or take into account that 2000 is a leap year. BIOSes created after 1996 fare a bit better — only 47% do not roll over to 2000.

In fact, many PC-based systems roll back to 1980 — the PC's birth date from which many BIOSes sprang forth. Some older systems do not allow entry of dates greater than 12/31/99.

Compounding matters, the PC or server system date can be injected into a network operating system (NOS) or nested within client/server applications that happen to tap the PC for date information, says Jay Reischl, a vice president at Double E Computer Systems, an Omaha, Neb., network integrator. So the potential is enormous for infecting your network applications with false date information.

But even before you commit to fixing system BIOSes, Reischl says you have to consider the impact false BIOS dates have on other LAN components. LAN-based applications also may be affected by the year 2000 bug. And if they, too, need an upgrade, you may be facing the need for a quantum leap in memory or even a push to the next fastest hardware platform — just to satisfy the application upgrade requirements.

Network operating systems

NOSes are intertwined with the PC BIOS issue in their ability to roll over system dates successfully to the year 2000. Because some NOS clients connect back to the server on boot-up for their time and date synchronization, they are highly reliant on the server hardware platform's ability to provide correct date information.

Ross Wilson, logistics planner for the year 2000 project at the Church of Jesus Christ of Latter-day Saints in Salt Lake City, says his organization's Novell, Inc. NetWare client workstations synchronize their internal clocks with NetWare servers as they log on. "If our servers get out of whack, so does everything else," he says.

Microsoft Corp. and Novell have committed to releasing year 2000-compliant versions of NT Server and NetWare. In Novell's case, the company said a future point release of NetWare will be year 2000-compliant. That means an upgrade for users still plugging away with NetWare 3.X and early NetWare 4 versions.

NT Server and NetWare operate via their own file systems, so a fair amount of file and directory caching is based on dates that at present are not year 2000-compliant. Internal functions such as security (specifically assigning user rights) rely heavily on NOS dates, and they need to be evaluated for year 2000 date rollover, says Steve Smith, director of enterprise technology at Terasys, Inc., a systems integrator specializing in NT Server and NetWare.

Moreover, because NOSes such as NetWare roll dates out to downstream clients upon boot-up, LAN administrators need contingency plans for network resident applications that pull their dates from the PC BIOS instead of the server, Double E's Reischl says. And don't forget to check how executables such as NetWare Loadable Modules and specialized backup programs for NetWare pull date information.

Terasys' Smith says companies also have to examine a whole battery of homegrown LAN applications developed with products such as Microsoft Access or Lotus Notes. Every homegrown application pulls dates from NOS or client workstations. If these applications aren't checked, companies may "lose important applications that have become the lifeblood of operations," Smith says.

Routers, switches and hubs

There's good news — and bad — for shops that rely on multiprotocol routers or ATM switches to anchor their enterprise networks. These devices mostly will be spared the mayhem created by the year 2000 bug. But they're not totally exempt.

Routers and switches do not use date stamps to process data, so they are expected to remain operational at the turn of the century. But routers that synchronize their operations with like devices via a network time server may run into a snag, according to Wilson.

Routers and switches do time-stamp net management alerts, and any misplaced dates may result in error messages being purged because the device considers them out of date. Or element management systems and error logs could fill up with error messages from routers or switches that generate alerts with bad dates.

Words of wisdom

The recurring theme of solving year 2000 problems is testing, but there are other tricks.

Mike Tercy, director of the Federal Defense Business Unit at GMSI, Inc., a network integrator that is the guardian of the Pentagon's year 2000 testing efforts, says you should press vendors for year 2000-compliant products by the end of 1998. That gives you ample time to integrate patches, test them in your environment and work out any kinks with suppliers.

Carl Schultz, a senior network engineer with GMSI, says you should leverage your maintenance contract renewals with vendors to ensure free upgrades to year 2000-compliant offerings.

Other experts suggest networking with year 2000 user groups so you can bounce ideas and problems off peers at other companies.

Whatever you do, start early, says Ingram Entertainment's Kilbane. "We've got two years to fix this," Kilbane says. "Let's dive in and get it done."

Year 2000 checklist

INTEROPERABILITY

- Inventory application and systems software, with an eye toward understanding the relationships between them, including how they exchange date info.
- Check interoperability between different brand systems.
- Align date information in host applications and downstream client programs.
- Rapidly deploy an interoperability test bed to test vendor compliant products against one another.

VOICE GEAR

- Identify time-of-day routing in PBX applications that will be affected by the year 2000 bug.
- Assess how automatic call distributors will be affected.
- Study software scripts in interactive voice response systems to identify date-related routines that may be affected.
- Check out message indexing in voice mail systems and make adjustments to avoid message purges.

MESSAGING

- Scour systems administration routines for date-related operations.
- Inspect e-mail gateways and their autoregistration data info.
- Set up a pilot network and roll the date forward to gauge potential loss of functionality.

SERVERS AND DESKTOPS

- Inventory system BIOS types and evaluate if they roll over dates correctly.
- Learn what applications derive their dates from servers and workstations.
- Evaluate impact of false date info on desktop and server applications.
- Research possible flash BIOS upgrades that may be downloaded from the Web.

NOSES

- Evaluate NOS file systems for date irregularities.
- Look for date functions in security functions that may be impacted.
- Test backup programs and NLMs that may be suspect to year 2000 date errors.
- Check out homegrown LAN applications.
- Test dependencies between PC hardware, NOSes, client OSes and applications.

ROUTERS AND SWITCHES

- Dig for date inconsistencies between routers and network time servers.
- Consider impact of year 2000 date errors on router/switch management.
- Test router/switch alert generation for possible propagation of incorrect dates.
- Test year 2000-compliant products against one another.

PHOTO: SHAWN HENRY

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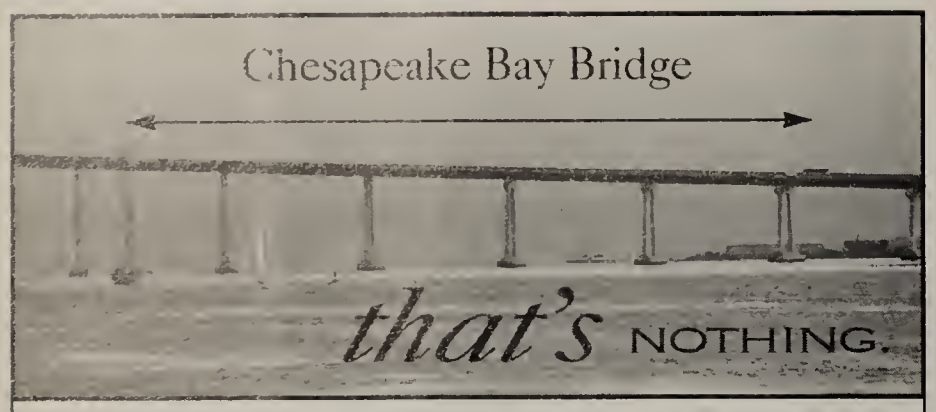

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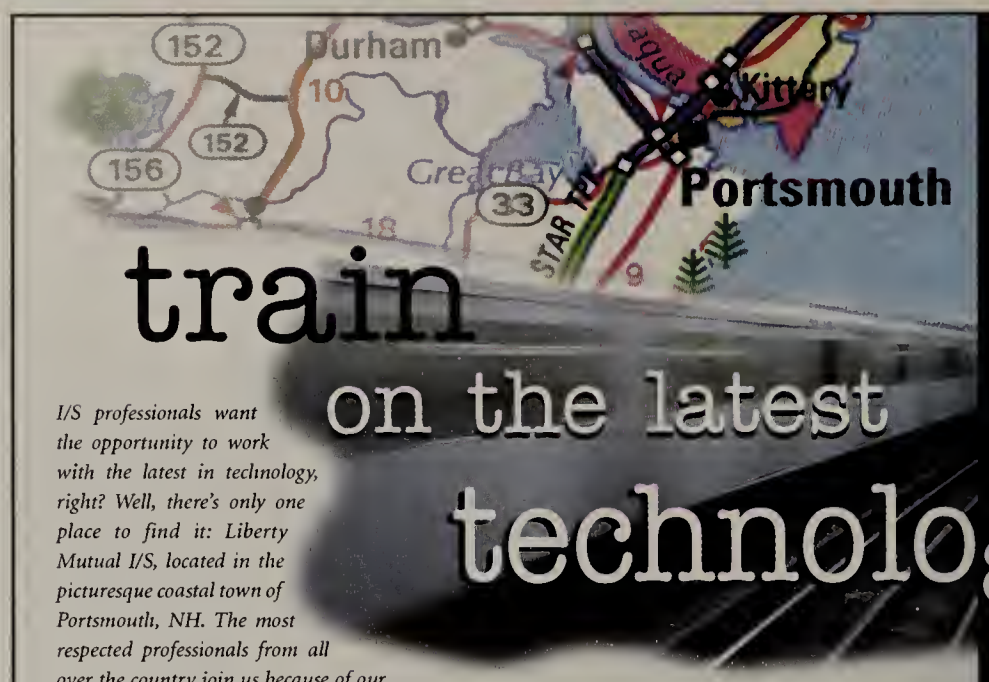

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7. Define the principal motivation driving your IPv6 upgrade strategy: host-based features or router-based features.
8. Learn how to strategically plan your transition from IPv4 to IPv6, and steps that should be taken at critical points along the way.
9. Learn about the 6Bone — a worldwide IPv6 network operating in over two dozen countries and how to connect your network and gain personal experience with IPv6.
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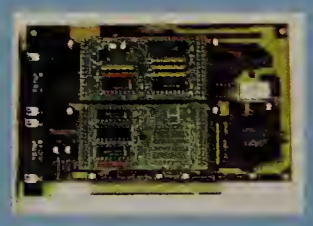

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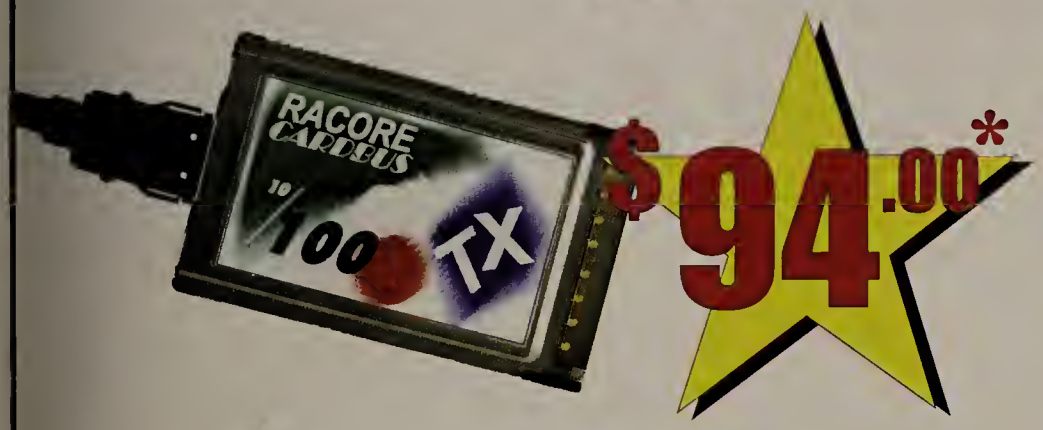

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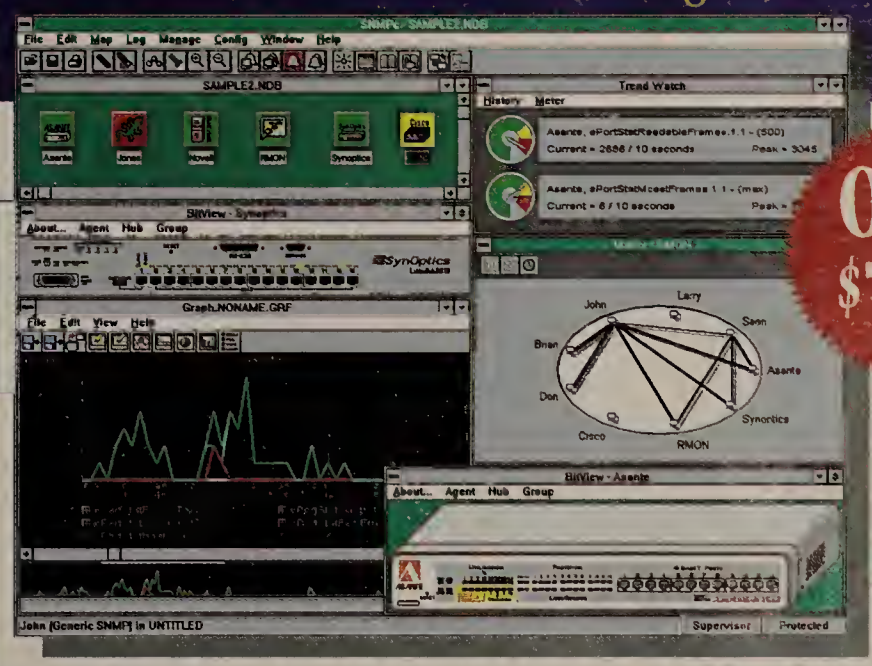

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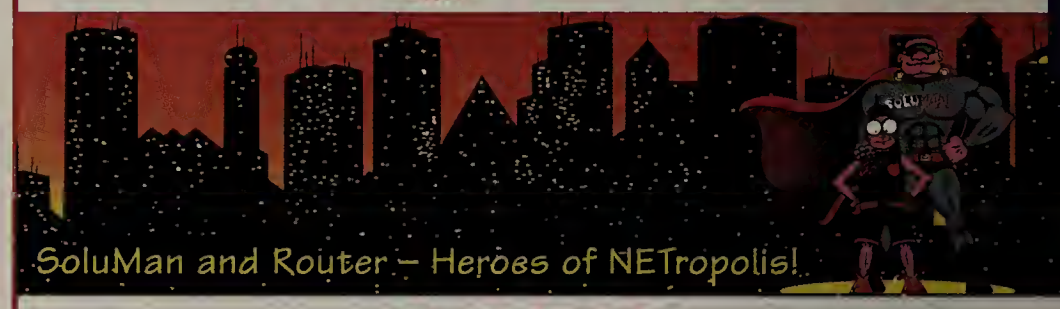

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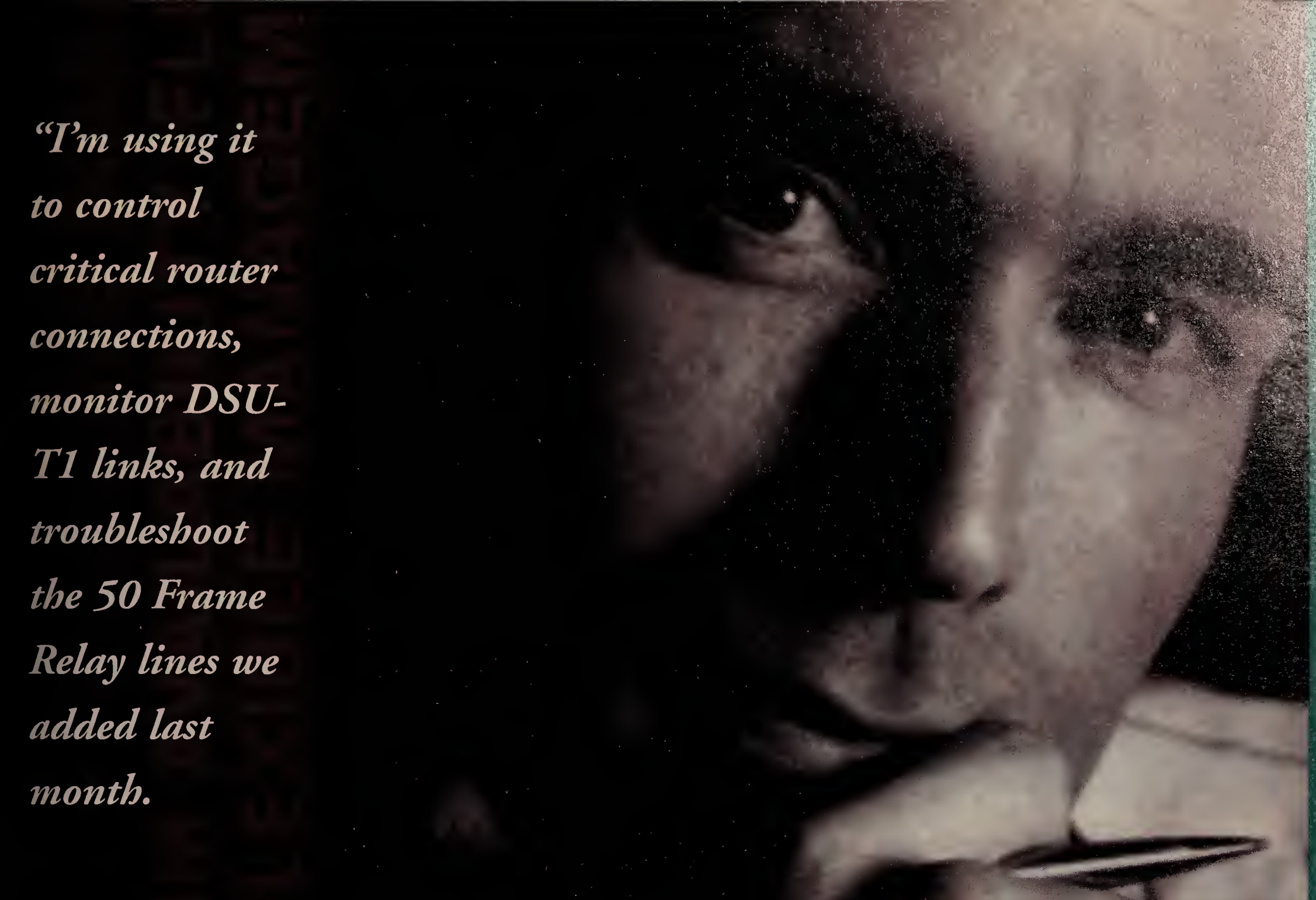

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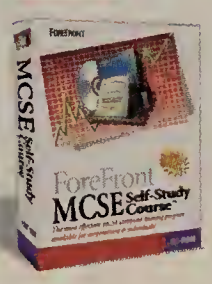

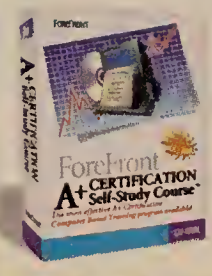

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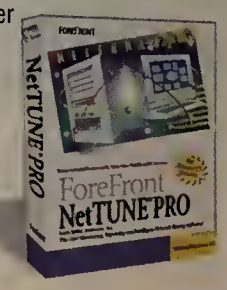

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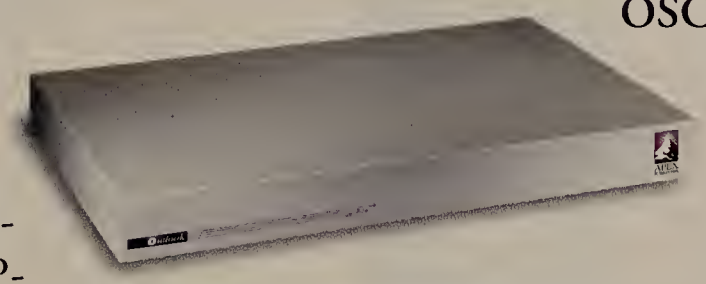

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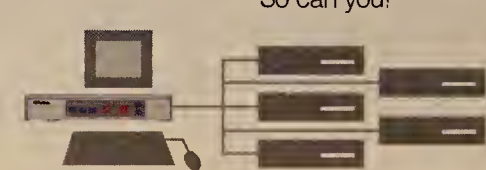

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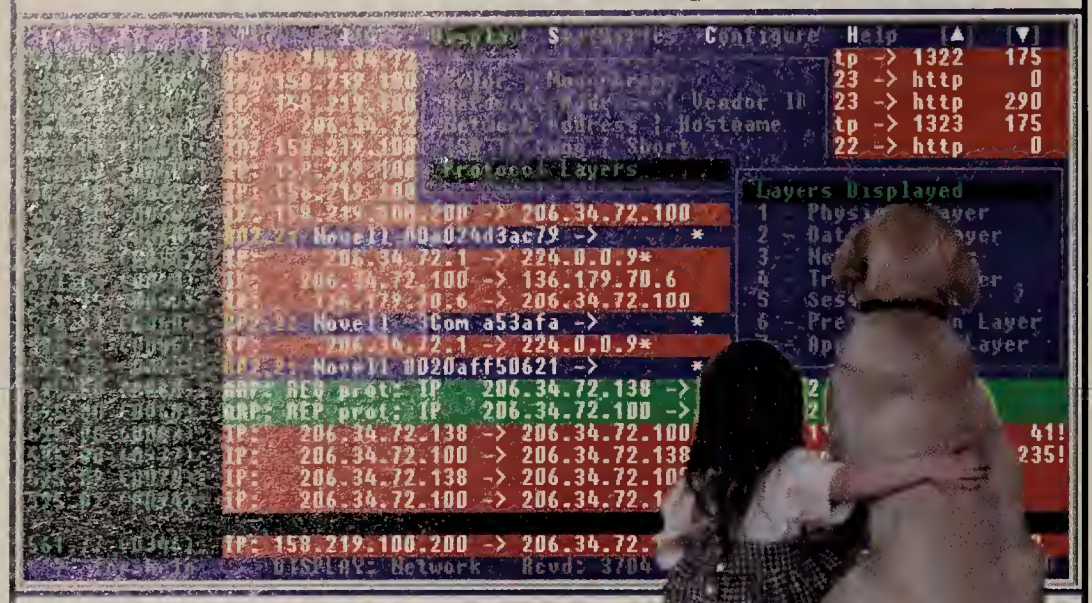

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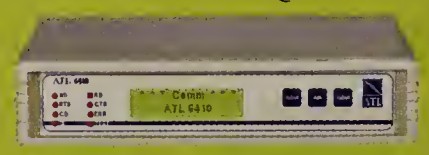

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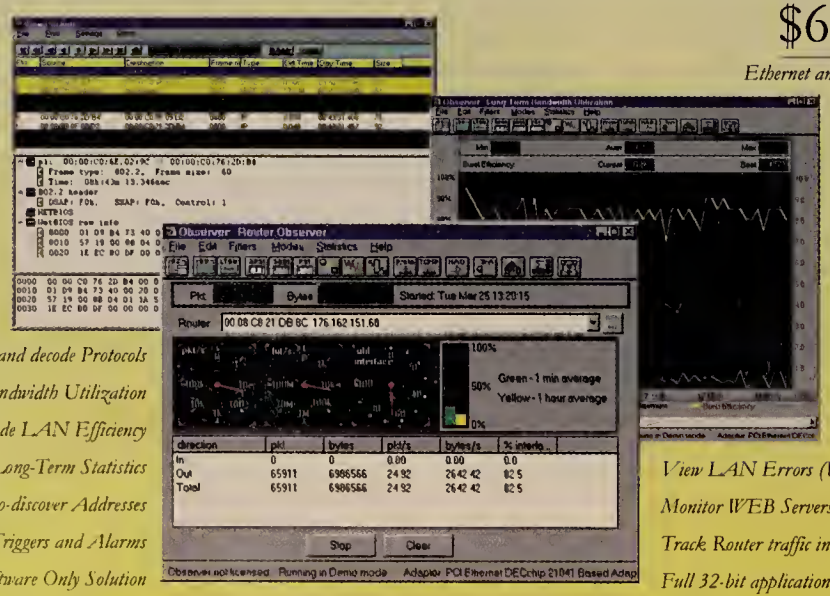

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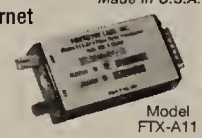
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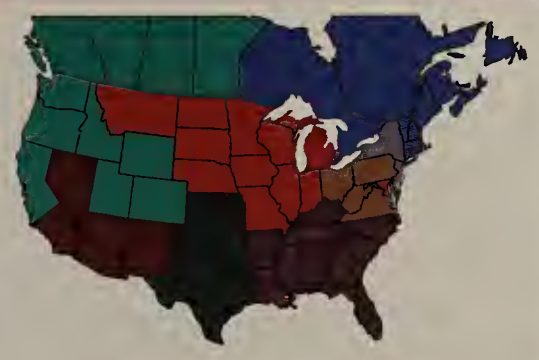

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EDITORIAL INDEX

3Com....49,74
A
Access Beyond....29
Accton....22
ACT Networks....29
Alcatel....33
Alteon....74
Amati....33
Ameritech....83
Analog Devices....29
ANS....66
AOL....18
Apple....22
ArelNet....33
Ariel....29
AT&T....83
Avesta....8
Aziza....29
B
Bay....8,21,49,74
BlueCurve....71
BMC....29,49,99
Borland....39
Boundless....97
Bull....18
C
CA....8,49,71,99
Cable & Wireless....10
Cabletron....18,49,74
Castelle....10
Cisco....8,18,21,23,29,49,74
Citrix....97,98
Compaq....25,49,71
CompuServe....10,18
D
Dayna....28
Digex....18
Digital....71
E
Extreme....74,79
F
Finjan....99
FORE....25
Foundry....74
Funk Software....29
G
GTE....18
H
HP....8,18,25,29,49,71,99
I
IBM....10,12,18,31,39,66,97
Imagen....29
Infonet....36
Insignia....97
Intel....10,28,49
Intrusion Detection....25
Ipsilon....74
K
Kaspia....29
L
Lotus....102
Lucent....102
M
Marimba....41
Master Design & Development....71
Matrix Information....120
MCI....18,33,79
Mercantec....16
Microsoft....8,10,18,19,21,23
25,29,39,49,71,79,97,99,100,102
Mission Critical Software....71
N
Natural MicroSystems....36
NCD....22
NCI....22
NCR....17
Neoware....25,97,98
NetAccess....29
NetIQ....71
Netscape....8,12,23,39,99
NetSpeak....36
Network Integrity....71
Networks Telephony....36
NetXchange....10
Newbridge....33
Nortel....10,33
Novell....10,25,102
NuView....71
O
OneBox....21
Optimal....99
Oracle....12,22,97
P
Packet Engines....74
PadCom....33
Patriot Scientific....8
Prominet....25,74
PSINet....16,66
Q
Qualcomm....39
R
RAScom....29
S
SBC....33
SCO....33
Seagate....49
Siemens....33
Software.com....8
Sprint....66
Sun....8,12,18,19,23,49,97,99,100
Symantec....71
T
Tivoli....49,71,99
Traveling Software....29
U
Umax....22
US WEST....17,18,33
UUNET....17,18,66
V
Vinca....71
Virtual Motion....29
W
Web International....120
WebManage....39
WorldPay....16
Wyse....98
X
Xcert....17
Xerox....25
Xyplex....29

ADVERTISER INDEX

Advertiser	Reader Service#	Page#
3Com		6
Alcatel Data Networks		85
Amco Engineering Company	250	112
American Power Conversion		37
American Tech Labs	302	116
AMP		86
Apex PC Solutions	251	113
Attachmate Corp		28
Bay Networks		122
Castle Rock Computing	252	109
Check Point Software		57
Computer Associates		48
Cybex Computer Products	227	110
Dataprobe Inc	285	116
Digi International		96
Eastern Research Inc	225	117
FastComm Communications		9
ForeFront Direct Inc	237	112
Foundry Networks		24
Gateway 2000		2-5
General Datacomm		44
General Signal Networks	265	111
Global Technology Associates	292	110
Hewlett Packard		13
High Point Solutions	282	117
HT Communications		36
Hypercom Inc		78
IBM		64-65,121
ICON Corp		89
Innosoft International		22
Interface Systems		19
Internet Security Systems	275	114
ITT Cannon		73
JVC Inc		52
Lotus Development Corp		34-35
McData Corp		31
MCI Communications		46
Micom Communications		11
Microcom Inc		14-15
Mier Communications		84
NBASE Communications		26-27,77
NEC Technologies		40-41
NetPartners Inc		76
Network Instruments	290	116
Newbridge Networks		20
NORTEL		81
Olicom USA Inc		70
Paradyne Corp		30,82
Precision Guesswork	254	116
Procom Technology		69
Prominet		61
Pulse Communications	264	114
Racal Datacom		51
Racore Corp	239	109
Raritan Computer	314	114
SDL Comm Inc	277	109
Siemens Business Communication		62-63
Solunet Inc	298	110
Sync Research		53
TCG		32
Telecommuting & Home Office Expo		38
TODD Enterprises Inc	266	114
UUNET		93
West Hills LAN Systems	297	115
WilTel		16-17
XLNT Design		90

Supplement

ACT Networks		23
ADC Kentrox		21
Adtran		15
Ascom Timeplex		39
Cabletron		13
Cisco Systems		17
Equant		44
FastComm Communications		11
Hypercom		19
Intermedia Communications		25
Memotec Communications		43
Micom Communications		33
Nuera		2
Paradyne Corp		37
RAD Data Communications		35
Sprint		41
Sync Research		9
Visual Networks		7

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Anixter (2)	IBM (4)	Plaintree Systems
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Backspin

A Sweat and Puffery test

Hype, v., hyped, hyping, n. Informal. v.t.

To create interest in by flamboyant or dramatic methods; to promote or publicize showily; to intensify by ingenious or questionable claims, methods, etc.; exaggerated publicity; hoopla.

— *Random House Unabridged Dictionary*

Did you know that Gigabit Ethernet will herald a new era of network cost-effectiveness and simplicity? Did you know that you can earn thousands of dollars per day with a personal Web site? Did you know that Java will replace all other computer languages?

Unless you're unusually gullible, you'll be saying, "What a load of cr . . . nonsense." And, of course, you're right — those statements are nothing more than hype. But hype is natural. It is a product of a competitive market. A result of the buzz surrounding products and services.

Mark Gibbs

Hype is the sweat of promotional buzz. It's the hot, slick layer that glosses the puffery of products, services and ideas that people want you to buy, adopt or invest in.

Hype pretends that flaws are features and sells negatives (that products are likely to fail) as positives (a three-year warranty).

Of course, hyping products, or for that matter anything, is not a new phenomenon — ever heard of snake oil? Out in the Wild West, hustlers and con artists would roll into town and set up a stall to sell patent medicine. They'd claim all sorts of wonderful benefits for their elixirs and potions and, if they were lucky, they'd make a couple of bucks.

But information technology snake oil is different than most other kinds of hype. The nature of IT products makes them hard to examine. It is not unusual for IT managers to do their homework and then select a product that, in their environment, doesn't actually do what it is supposed to do.

So how do you spot potential hype? Use the Gibbs Institute Hype Detection Method (guaranteed not to fail, exclusions and misuse excepted):

- Test 1: Does the vendor use performance superlatives ("biggest," "fastest," "widest," etc.)? These are definite flag raisers because, as we all know, the rate of computer technology evolution makes the use of any superlative a lie before the brochure is printed.
- Test 2: Is the product a "beta"? I put quotes around the term because many so-called beta products should be labeled "teaser," such as "Teaser release 23." Just look at Netscape's recent wave of "beta du jour" that culminated in Netscape 4.0. Unless there's something unusual about my system, this isn't a stable product. It is an advertisement for a product they may one day get around to optimizing and debugging.
- Test 3: Does the product name contain a word that has become part of thematic naming, such as "active"? The obsessive use of an action word as a product identifier is synonymous with hype.
- Test 4: Does the vendor use generic quality descriptions such as "leading edge," "cost-effective," "easy-to-use," or "advanced"? A dead hype giveaway.

Here at the Gibbs Institute, we plan to run courses on hype detection and avoidance. Our easy-to-understand advanced courses, currently in beta testing, will be the most leading-edge and cost-effective in the industry.

Sign up today at nwcolumn@gibbs.com or spin your message on (800) 622-1108, Ext 7504.

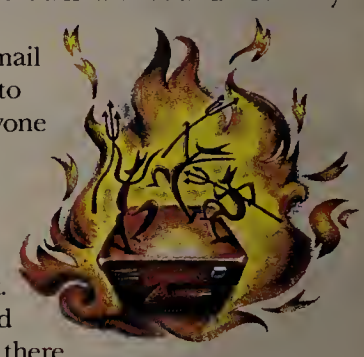
'Net Buzz

The latest on the Internet/intranet industry

By Chris Nerney

A WARNING ABOUT VIRUS WARNINGS Normally we don't take much notice of Internet virus warnings. Sure, we lost our hard drive once, but we're not the type to hysterically conclude that some malevolent, uncontrollable virus was the culprit when we could lay the blame on more rational causes, such as sorcery or **Beelzebub.**

However, this warning was different. It was from someone we knew. He was passing along an e-mail that began: "If you receive an e-mail titled **'Join the Crew'** DO NOT open it! It will erase EVERYTHING on your hard drive! Send this letter out to as many people you can . . . This is a new virus and not many people know about it!"



The message went on to describe a second e-mail virus, titled **"Penpal Greetings,"** which was said to destroy your hard drive and the hard drive of anyone whose e-mail is in your box.

We don't mind telling you we were scared, especially since the author of the e-mail said he had been personally warned by **IBM** of the first virus. At least Big Blue is on the case, we thought.

It turns out, of course, that IBM never warned anybody about the "Join the Crew" virus because there is no such virus. It's one of many virus hoaxes and myths debunked by **Rob Rosenberger** on his computer viruses and myths Web page (http://kumite.com/myths).

Rosenberger is an IT professional and, well, computer virus hoax and myth debunker. According to his site, 'Net Buzz fell for "the latest fad: combination alerts," with "Join the Crew" and "Penpal Greetings" cited as a prime example of such double warnings.

The site contains a ton of information about Internet virus hoaxes, including warnings about three disasters allegedly timed for Oct. 1. One of these forecasts that "every single user of **AOL** will go belly-up on that date."

Allright, make that two disasters and a promise.

WHERE THE INTERNET IS REALLY BUZZING A company that tracks Internet growth statistics has released a new survey listing the U.S. counties with the largest Internet presence.

Matrix Information and Directory Services, Inc. (MIDS), of Austin, Texas, based its rankings on the total number of Web hosts per capita.

Not surprisingly, counties in the San Francisco and Silicon Valley areas dominate, grabbing the top two and No. 8 slots, while the Cambridge/Route 128 area of Massachusetts is No. 6.

Still, there are some surprises for those who think the Internet is a coastal thing. Landing on the MIDS list for the first time are the St. Louis area — where **McDonnell-Douglas** and **Southwestern Bell** are located — and Travis County, Texas, home to the **University of Texas.**

Holdovers from last year's list include Washtenaw County, Mich., and Hennepin County, Minn., which also are home to their respective state universities.

MIDS has made available several maps showing Internet density per U.S. county at www.mids.org/mmq/402.

YOU GET THE STATS, ADVERTISERS PICK UP THE TAB A Web design and hosting company in Baltimore is offering free graphic and numeric analysis of traffic on Web site pages. The company, **Web International Commercial Advertising,** says its Pagecount service provides password-protected statistics that detail the number of visitors to a site; the types of operating systems, browsers, proxy and cache servers used; activities by day, date and time; and visitor origins by country and network type (commercial, educational, government or nonprofit).

The service will be financed by banner advertisements placed on customers' pages. The ads can be tailored to 17 different categories, including travel, sports, computer hardware and software, entertainment and adult. You choose the one that best fits your Web site.

Next week 'Net Buzz will be reporting from London, where some of the hottest Internet and intranet start-ups in Europe will be gathering for a venture capital conference. Please pass along your best 'Net-related news items so we Yanks can keep up our end of the cocktail reception chatter. Otherwise, we'll have to try to dazzle them with some e-mail virus alerts.

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REASON No. 4

One switch for segments and/or individual users

Your enterprise is growing up. And you've got the bottlenecks to prove it. But you haven't been able to justify making the move to desktop switching. Now, Bay Networks Adaptive Networking takes the downside out of upgrading.

Only Bay Networks BayStack™ 303 and 304 Ethernet switches give you the benefits of high-speed switched Ethernet for both LAN segments and desktops, at a price that everyone can afford.

To fit any application and budget, the BayStack 303 accommodates 24 ports of dedicated 10BASE-T Ethernet (make that 12 ports for the BayStack 304). Plus one or two 10/100 mbps autosense ports for servers and backbones, and RMON management. Both switches let you split your network into segments of 1 to 1,023 addresses each.

So if you're thinking it's time to switch, don't fight it. Visit our Web site at www.baynetworks.com/bs303-4/nw or call us today at 1-800-8-BAYNET, ext. 351.

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1.800.8.BAYNET ext. 351

* *US list price for BayStack 303, as of August 1, 1997*

www.baynetworks.com/bs303-4/nw

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